UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF OCEAN ENERGY MANAGEMENT
GULF OF AMERICA REGION
NEW ORLEANS, LOUISIANA

SITE-SPECIFIC ENVIRONMENTAL ASSESSMENT

OF

GEOLOGICAL & GEOPHYSICAL SURVEY APPLICATION T25-004

FOR

TGS

May 20, 2026

RELATED ENVIRONMENTAL DOCUMENTS

Gulf of Mexico OCS Proposed Geological and Geophysical Activities
Western, Central, and Eastern Planning Areas, Final Programmatic Environmental Impact Statement
(OCS EIS/EA BOEM 2017-051)

Biological Opinion Oil and Gas Leasing, Exploration, Development, Production, Decommissioning, and All Related Activities in the Gulf of Mexico Outer Continental Shelf
(FWS April 20, 2018)

Biological Environmental Background Report for the Gulf of Mexico OCS Region (OCS Report 2021-015)

Biological and Conference Opinion on Bureau of Ocean Energy Management and Bureau of Safety and Environmental Enforcement's Oil and Gas Program Activities in the Gulf of America
(NMFS May 20, 2025)

Gulf of America Regional OCS Oil and Gas Lease Sales and Post-Lease Activities
Final Programmatic Environmental Impact Statement
(OCS EIS/EA BOEM 2025-042)

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

The Bureau of Ocean Energy Management (BOEM) has prepared a Site-Specific Environmental Assessment (SEA) for application T25-004 complying with the National Environmental Policy Act (NEPA) at 42 United States Code (U.S.C.) §§ 4321 et seq. The United States Department of the Interior (DOI) NEPA implementing regulations at 43 Code of Federal Regulations (CFR) Part 46, DOI NEPA Handbook §1.5, and BOEM policy require an evaluation of proposed major Federal actions, which under BOEM jurisdiction includes oil and gas exploration or development activity on the Outer Continental Shelf (OCS).

The potential effects or impacts caused by similar actions to those proposed were examined at a basin-wide scale on the OCS in the following documents, from which this SEA is tiered:

- GOM G&G PEIS – Gulf of Mexico OCS Proposed Geological and Geophysical Activities Western, Central, and Eastern Planning Areas Final Programmatic Environmental Impact Statement (OCS EIS/EA BOEM 2017-051).
- 2025 PEIS – Gulf of America Regional OCS Oil and Gas Lease Sales and Post-Lease Activities Final Programmatic Environmental Impact Statement (OCS EIS/EA BOEM 2025-042).

This SEA also considers the impacts of the proposed action and incorporates by reference the evaluations below:

- 2018 FWS BO – Biological Opinion Oil and Gas Leasing, Exploration, Development, Production, Decommissioning, and All Related Activities in the Gulf of Mexico Outer Continental Shelf, United States Fish and Wildlife Service (FWS) April 20, 2018.
- 2021 BEBR – Biological Environmental Background Report for the Gulf of Mexico OCS Region (OCS Report 2021-015).
- 2025 NMFS BiOp – Biological and Conference Opinion on Bureau of Ocean Energy Management and Bureau of Safety and Environmental Enforcement's Oil and Gas Program Activities in the Gulf of America, National Marine Fisheries Service (NMFS) May 20, 2025.

Secretary of the Interior Doug Burgum issued Secretary's Order 3423, which directed the renaming of the Gulf of Mexico (GOM) to the Gulf of America. As a result, BOEM updated existing content while legacy content such as previously published reports, studies, and NEPA documents remain unchanged.

Proposed Action: TGS proposes to conduct an active acoustic seismic survey utilizing airgun arrays with ocean bottom nodes (OBNs) and pressure inverted echo sounders (PIES). The OBNs will be placed on the seafloor and recovered using a remote operational vehicle (ROV). TGS is also proposing to place up to 8 PIES on the seafloor during the survey. Up to nine vessels will be utilized for survey activities; the *Eagle Explorer*, the *Sanco Sword*, and the *Sanco Swift* have been designated as source vessels for towing the airgun arrays, the *Olympic Artemis*, the *Island Pride*, the *Armada 8603*, the *Subsea Responder 4*, and the *Chloe Candies* have been designated as receiver vessels for deployment and retrieval of OBNs and PIES from the seafloor, and the Kolt Levi has been designated as the supply vessel. The proposed activities are located south of Texas and Louisiana in the Central and Western Planning Areas. The proposed survey covers 161 OCS blocks in East Breaks, Garden Banks, Alaminos Canyon, and Keathley Canyon.

The area of the proposed action is in water depths ranging from approximately 1,640 to 6,562 feet (ft) (500 to 2,000 meters [m]). Site-specific analysis was completed using TGS' description of the proposed operations; however, specific technical information regarding the geological and geophysical (G&G) activities described in the permit application is proprietary and therefore is not included in this document. The proposed survey is expected to take approximately one year to complete and will begin in August 2026.

Factors Considered in this Determination: The impacts from the proposed action are further analyzed at the site-specific level in this Environmental Assessment. The impact analysis for the proposed activity focused on the geological and geophysical activities and the resources that may be potentially impacted. The impact producing factors (IPF) include: (1) active acoustic sound sources, (2) seafloor disturbance, (3) vessel noise, (4) vessel traffic, and (5) marine trash and debris.

In this SEA, BOEM has considered three alternatives: (1) No Action, (2) Proposed Action as Submitted, and (3) Proposed Action with Conditions of Approval (COAs). BOEM has assessed the impacts of the proposed action on the following resources:

- marine mammals
- sea turtles
- fish
- benthic communities
- archaeological resources.
- other users (i.e., military).

The use of an active acoustic sound source (airgun) is potentially the most disruptive impact for a free-swimming individual or groups of marine mammals, turtles, and fish in proximity to the airgun in operation. The effect of an active acoustic sound source is weighted most heavily out of all other potential impacting factors. Individual animals are vulnerable to injury if hit by the survey vessel from the proposed action. COAs include the monitoring of an exclusion zone by trained protected species observers and activation of survey shutdown requirements when mammals are observed (1) within the exclusion zone or in proximity to an active acoustic sound source, or (2) near the vessel. The application of passive acoustic monitoring, a visually / acoustically monitored exclusion zone, shutdown criteria, and vessel avoidance are designed to remove the possibility that animals and an operating airgun are located in the same place at the same time; therefore, groups or individuals are not unduly affected by underwater noise or exposed to being hit by the survey vessel. The impacts of the proposed activities from active acoustic sound sources have been mitigated to **nominal** to **minor** for marine mammals and **nominal** for sea turtles and fish. The impacts of the proposed activity from vessel strike have been mitigated to **nominal** to **moderate** for marine mammals, **nominal** to **minor** for sea turtles, and **nominal** for fish. The impacts of the proposed activity from vessel noises or marine trash and debris to marine mammals, sea turtles, fish, and other users have been mitigated to **nominal**. Impact significance levels are explained in **Chapter 3.1** of this SEA.

Our evaluation in this SEA has selected Alternative 3 and serves as the basis for approving the proposed action. BOEM concludes that no significant impacts are expected to occur to any affected resources by allowing the proposed activities to proceed, provided that the specific COAs and monitoring measures identified below are met by the operator.

- **PROJECT CRITERIA:** The applicant will adhere to the following Project Criteria, as described in the Appendix to this SEA.
    - **GEOPHYSICAL SURVEY PROJECT CRITERIA**
    - **MARINE DEBRIS PROJECT CRITERIA**
    - **VESSEL STRIKE AVOIDANCE AND INJURED AND/OR DEAD AQUATIC PROTECTED SPECIES REPORTING PROJECT CRITERIA**
    - **VESSEL TRANSIT WITHIN THE RICE'S WHALE AREA**
    - **IN-WATER LINE PRECAUTION PROJECT CRITERIA**
    - **MOON POOL MONITORING PROJECT CRITERIA**
    - **SEA TURTLE RESUSCITATION GUIDELINES PROJECT CRITERIA**

- **NON-RECURRING MITIGATION FOR THE PROTECTION OF POTENTIAL ARCHAEOLOGICAL RESOURCES:** This review indicates that at least three potential archaeological targets existing within the area of proposed remotely operated vehicle (ROV), 3D seismic, and PIES operations within the Federal waters of the OCS. The target locations will require avoidance as listed in the avoidance table appended under separate cover. No operations may be conducted within the avoidance boundary listed in the table. Your accuracy margin-of-error for placement locations should be added to the listed avoidance boundary, to ensure that the area is adequately avoided. If operations fall within currently proposed avoidance boundaries, these locations must either be relocated outside of the avoidance boundaries or removed from the operational design. Alternatively, if you can visually confirm that the target is not a potential archaeological site, further avoidance will not be necessary. Guidance for conducting a visual survey is provided below.

  Significant portions of the project area within the OCS have received either limited or no previous archaeological survey. These areas could contain additional archaeological materials that may be impacted by the proposed operations. All ROV operations must avoid impacting archaeological resources with the tether. One option is to use an ROV Tether Management System (TMS) to minimize entanglement risk and mitigate unnecessary seafloor contact. A second option would be to manually reduce slack in the tether during dive operations. Other options can be used if they are sufficient to actively avoid impacting archaeological sites, but they will need prior review and approval with BOEM archaeology. If you choose to develop your own tether management solution, email archaeology@boem.gov noting your application number in the subject line of the email.

  Following the completion of fieldwork, the applicant must submit as-placed plats, at a scale of 1-inch = 1,000 ft, of all cores relative to the listed target and the avoidance boundary. If remote-sensing survey data is collected for any reason during the course of this project (i.e., side-scan sonar, sector-scan sonar, multi-beam bathymetry, or magnetometer), the applicant must submit copies of these data to BOEM.

  Guidance for conducting an ROV investigation for target clearance

  If the applicant chooses to investigate the target(s) with an ROV, the applicant should collect enough video data to determine if it is a cultural resource (e.g., a sonar image or visual confirmation of an iron, steel, or wooden hull, wooden timbers, anchors, concentrations of human-made objects, such as bottles or ceramics, piles of ballast rock, aircraft wreckage or remains). If the target appears to be a cultural resource as described above, the applicant should document as best as possible the horizontal and vertical extents of the wreck and any associated debris fields. The applicant shall not physically impact the site in any way or remove any artifacts. If the target appears to be a shipwreck or a potential shipwreck, the applicant must continue to avoid it but may reduce the avoidance radius to a minimum of 100 ft from the primary wreck site and any visible debris. If the target is conclusively not a shipwreck, no further avoidance is necessary. All ROV video collected at the target must be submitted to BOEM at the conclusion of fieldwork.

  Please direct any questions or correspondence pertaining to these requirements to Mr. Scott Sorset at (504) 736-2999 or by emailing archaeology@boem.gov.

- **NON-RECURRING MITIGATION BENTHIC COMMUNITIES:** BOEM review of geophysical activities proposed in T25-004 identified confirmed and potential sensitive sessile benthic resources within the proposed node area. According to Notice to Lessees (NTL) 2009-G40, the minimum separation distance for bottom disturbing activities is 76 m (250 ft) from any sensitive sessile benthic community (e.g., deepwater coral, chemosynthetic tube worms). Based on the methods described in the application, BOEM authorizes the applicant to deploy nodes with less than 76 m (250 ft) avoidance of high-density deepwater benthic communities contingent upon the applicant adhering to the mitigations described below:

1. All seafloor disturbances, including nodes, cables, and ROV, must remain a minimum of 5 m (16 ft) from **all sensitive sessile benthic communities**.
2. The operator must photograph the seabed within a 10 m (33 ft) radius of any node placed within 76 m (250 ft) of **sensitive sessile benthic communities** or a **BOEM anomaly** (June 2019 dataset, see link below). Photographs of each such location shall be taken pre-node deployment, post-node deployment, and post-node retrieval. The photos shall clearly show the geographic location of each node.
3. If any sessile benthic communities are present at a proposed node location, a new site that allows compliance with the above requirements shall be selected.
4. The operator must provide an as-placed GIS shapefile of actual OBN locations to demonstrate compliance. Submit the required photographs and shapefile to the BOEM Regional Supervisor, Office of Resource Evaluation, Data Acquisition and Special Projects Unit, within 90 calendar days after you complete the G&G activity.

Refer to the following BOEM site for GIS data layers of known 3D seismic water bottom anomalies: https://www.boem.gov/Seismic-Water-Bottom-Anomalies-Map-Gallery/

The following feature classes have a high probability of supporting sensitive sessile benthic organisms and shall be avoided unless visual inspection and photographic data confirm an absence of high-density deepwater benthic communities:

1. Anomaly_patchreefs (Shallow Water)
2. Anomaly_confirmed_patchreefs (Shallow Water)
3. Seep_anomaly_positives
4. Seep_anomaly_positives_possible_oil
5. Seep_anomaly_positives_confirmed_oil
6. Seep_anomaly_positives_confirmed_gas
7. Seep_anomaly_confirmed_corals
8. Seep_anomaly_confirmed_organisms
9. Seep_anomaly_confirmed_hydrate
10. Seep_anomaly_confirmed_carbonate
11. Anomaly_Cretaceous
12. Anomaly_Cretaceous_talus

If you have any question regarding this mitigation, please contact Dr. Alicia Caporaso – Benthic Ecology Lead (Alicia.Caporaso@BOEM.gov).

- **MILITARY WARNING AREA COORDINATION**: Our review indicates that the routes to be taken by boats in support of your proposed activities are within Military Warning Areas W-147AB, W-147D, W-147E and W-602 shown at: http://www.boem.gov/Environmental-Stewardship/Environmental-Studies/Gulf-of-Mexico-Region/MWA_boundaries-pdf.aspx. You shall contact the appropriate individual military command headquarters concerning the control of electromagnetic emissions and use of boats in each of the areas before commencing your operations. A list of contacts can be found at: http://www.boem.gov/Environmental-Stewardship/Environmental-Studies/Gulf-of-Mexico-Region/Military-Contacts-pdf.aspx.

Conclusion: BOEM has evaluated the potential environmental impacts of the proposed action. Based on the SEA for application T25-004, BOEM has determined that the proposed action with COAs would have no significant impact on the marine, coastal, or human environment provided that the avoidance and mitigation measures required through conditions of approval are met by the operator. Therefore, an Environmental Impact Statement will not be required.

PERRY BOUDREAUX

Digitally signed by PERRY BOUDREAUX
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May 21, 2026

Perry Boudreaux
Environmental Assessment Unit 2
Office of Environment, GOA OCS Region
Bureau of Ocean Energy Management

Date

CERTIFICATION OF ENVIRONMENTAL ASSESSMENT COMPLIANCE

This letter certifies the attached site-specific environmental assessment (SEA) for Geological and Geophysical (G&G) application T25-004, submitted by TGS, complies with the requirements outlined in Section 1.5 of the United States Department of the Interior (DOI) Handbook of National Environmental Policy Act (NEPA) Implementing Procedures (516 DM 1).

Page Limit Certification

The SEA, not including citations and appendices, does not exceed the 75-page limit. This document has been prepared in accordance with the specified formatting criteria outlined in Section 1.5(e) of 516 DM 1. As the responsible official, I certify that the breadth and depth of the analysis have been tailored to meet this page limit. This SEA represents the Bureau of Ocean Energy Management's (BOEM's) good-faith effort to prioritize the most important considerations required by NEPA within the mandated page limits. Our prioritization reflects the bureau's expert judgment, and any considerations addressed briefly or left unaddressed were, in our judgment, not of a substantive nature that would have meaningfully informed the environmental effects or the resulting decision.

Deadline Certification

This SEA has been completed within the required statutory deadline described in Section 1.5(f) of 516 DM 1. The completion date of this document is within one year of February 26, 2026, which is when the T25-004 application was deemed submitted as per 30 Code of Federal Regulations (CFR) § 550.231. I certify that this document represents the bureau's good-faith effort to fulfill NEPA's requirements within the congressional timeline. In our expert opinion, the analysis is thorough and adequate to inform and reasonably explain the bureau's decision regarding the proposed action.

PERRY BOUDREAUX

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May 21, 2026

Perry Boudreaux
Environmental Assessment Unit 2
Office of Environment, GOA OCS Region
Bureau of Ocean Energy Management

Date

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PREPARED FOR
TGS
GEOLOGICAL AND GEOPHYSICAL SURVEY APPLICATION
T25-004

1. INTRODUCTION

TGS has submitted a permit application (T25-004) to conduct a geological and geophysical (G&G) survey on the Outer Continental Shelf (OCS). This Site-Specific Environmental Assessment (SEA) evaluates the specific impacts associated with TGS' proposed G&G survey activities. **Chapter 1.3** of this SEA provides specific details on the G&G activities proposed in TGS' application.

The potential effects or impacts caused by similar actions to those proposed were examined at a basin-wide scale on the OCS in the following documents, from which this SEA is tiered:

- GOM G&G PEIS – Gulf of Mexico OCS Proposed Geological and Geophysical Activities Western, Central, and Eastern Planning Areas Final Programmatic Environmental Impact Statement (OCS EIS/EA BOEM 2017-051) (BOEM, 2017)
- 2025 PEIS – Gulf of America Regional OCS Oil and Gas Lease Sales and Post-Lease Activities Final Programmatic Environmental Impact Statement (OCS EIS/EA BOEM 2025-042) (BOEM, 2025)

"Tiering" is designed to reduce and simplify the size of environmental assessments by eliminating repetitive discussions of impacts considered in prior National Environmental Policy Act (NEPA) compliance documents, allowing analyses to focus on those site-specific concerns and effects related to the action proposed. Tiering is subject to additional guidance under the United States Department of the Interior (DOI) regulations at 43 Code of Federal Regulations (CFR) § 46.140 and the DOI NEPA Handbook §3.2(c), wherein the site-specific analysis must note which conditions and effects addressed in the programmatic document remain valid and which conditions and effects require additional review.

This SEA also incorporates by reference the evaluations from the relevant environmental documents listed below:

- 2018 FWS BO – Biological Opinion Oil and Gas Leasing, Exploration, Development, Production, Decommissioning, and All Related Activities in the Gulf of Mexico Outer Continental Shelf, United States Fish and Wildlife Service (FWS) April 20, 2018 (FWS, 2018)
- 2021 BEBR – Biological Environmental Background Report for the Gulf of Mexico OCS Region (OCS Report 2021-015) (BOEM, 2021)
- 2025 NMFS BiOp – Biological and Conference Opinion on Bureau of Ocean Energy Management and Bureau of Safety and Environmental Enforcement's Oil and Gas Program Activities in the Gulf of America, National Marine Fisheries Service (NMFS) May 20, 2025 (NMFS, 2025a) and Appendices and Attachments (NMFS, 2025b)

Secretary of the Interior Doug Burgum issued Secretary's Order 3423, which directed the renaming of the Gulf of Mexico (GOM) to the Gulf of America. As a result, the Bureau of Ocean Energy Management (BOEM) updated existing content while legacy content such as previously published reports, studies, and NEPA documents remain unchanged.

For this SEA, all of the analyses prepared in the GOM G&G PEIS, 2018 FWS BO, 2021 BEBR, 2025 NMFS BiOp, and 2025 PEIS (referenced hereafter as relevant NEPA compliance documents) are sufficiently comprehensive and adequate to support decision making for TGS' proposed activities, with the following exceptions:

- **Active Acoustic Sound Sources and Vessel Noise and Traffic Impacts on Marine Mammals –** the environmental baseline since completion of the programmatic analyses may have experienced slight changes and/or new information has become available
- **Active Acoustic Sound Sources and Vessel Noise and Traffic Impacts on Sea Turtles –** the environmental baseline since completion of the programmatic analyses may have experienced slight changes and/or new information has become available
- **Active Acoustic Sound Source Impacts on Fish and Fisheries –** the environmental baseline since completion of the programmatic analyses may have experienced slight changes and/or new information has become available
- **Space-Use conflicts with other Users of the OCS –** survey operations have the potential to interfere with ongoing military operations in the area of the proposed action
- **Seafloor Disturbance –** site specific analysis is required to assess the impacts on biological features and archaeological resources that were not known during the preparation of the programmatic analyses.

Marine mammals, sea turtles, fish, benthic resources, archaeology, other uses (military), and commercial and recreational fisheries, as indicated in the GOM G&G PEIS, are susceptible to impacts from geophysical activities that may be considered adverse, but not significant. Impacts to fishes and commercial and recreational fisheries from the proposed activities are not expected due to the temporary nature of the operations. This SEA considers the potential for change in the status of resources and the potential for increased sensitivity of those resources to impacts from G&G activities.

Chapter 3 of this SEA will focus on new information relative to the cumulative environmental effects of this action. Where applicable, affected environment discussions and impact analyses from relevant NEPA compliance documents are summarized and utilized for this site-specific analysis and are incorporated by reference into this SEA. Appropriate conditions of approval (COAs) and monitoring measures identified in the relevant NEPA compliance documents have been considered in the evaluation of the proposed action.

1.1. BACKGROUND

BOEM and the Bureau of Safety and Environmental Enforcement (BSEE) are mandated to manage the development of OCS oil, gas, mineral resources, and renewable energy resources while ensuring safe operations and the protection of the human, marine, and coastal environments. One purpose of BOEM's regulatory program is to ensure that the G&G data is obtained in an environmentally safe manner. BOEM and BSEE regulate leasing, exploration, development, production, and decommissioning, and they perform environmental analyses during each of these phases. BOEM's Resource Evaluation Program oversees "speculative" G&G data acquisition and permitting activities pursuant to 30 CFR Parts 551 and 580. Specifically, 30 CFR Part 551 regulates prelease G&G exploratory operations for oil, gas, and sulfur resources, and 30 CFR Part 580 regulates prelease prospecting activities. BOEM's Office of Leasing and Plans oversees "on-lease" or "ancillary" G&G data acquisition pursuant to 30 CFR Part 550, which applies to post-lease G&G exploratory operations.

The G&G surveys provide information used by industry and government to evaluate the potential for offshore oil and gas resources, renewable energy development, mineral resources exploration and development, and geologic hazards in a particular area. Industry needs accurate data to determine the location, extent, and properties of hydrocarbon resources. Information on shallow geologic hazards and seafloor geotechnical properties assists in the safe and economical exploration, development, production, and transportation of hydrocarbons. Additionally, the results of G&G surveys characterize sea bottom conditions before installing a renewable energy facility or to verify the completion of decommissioning activities.

The scope of the effects on resources from activities proposed in TGS' G&G survey permit application, T25-004, were fully discussed and analyzed in the GOM G&G PEIS. Neither the specific location, equipment, nor the duration of this proposal will result in impacts different from

those discussed in the relevant NEPA compliance documents. Existing peer-reviewed literature and environmental monitoring suggests the proposed activity will not result in a different cumulative impact conclusion from what was made in the relevant NEPA compliance documents. This information was not available or considered during the preparation of the GOM G&G PEIS. Therefore, this SEA was prepared by BOEM to evaluate the operator's proposed G&G activities in light of any new changes in the baseline and/or new information.

1.2. Purpose of and Need for the Proposed Action

TGS has submitted a permit application T25-004 to conduct a G&G activity on the OCS. The permit application proposes to conduct a seismic survey using airguns with ocean bottom nodes (OBNs) and pressure inverted echosounders (PIES). The data collected can be utilized to evaluate the potential for, and develop plans for, the development and production of hydrocarbons or mineral resources on the OCS, which would help satisfy the Nation's need for energy or coastal restoration resources. Additional information regarding other survey activities can be found in the GOM G&G PEIS.

The need for this action is established by BOEM's responsibility under the Outer Continental Shelf Lands Act (OCSLA) to make OCS lands available for expeditious and orderly development, subject to environmental safeguards, in a manner that is consistent with the maintenance of competition and other national needs. Section 11 of the OCSLA at 43 United States Code (U.S.C.) 1340 requires anyone seeking to conduct such activities to first obtain approval from BOEM. The Secretary of the Interior oversees the OCS oil and gas program, and BOEM and BSEE are the agencies charged with this oversight and regulated management of the permitted or otherwise authorized oil and gas activities. The Secretary is required to balance orderly resource development with protection of the human, marine, and coastal environments while ensuring that the U.S. public receives a fair return for resources discovered on and produced from public lands (43 U.S.C. 1332[3]).

In response to the proposed activities in TGS' application, BOEM has regulatory responsibility, consistent with the OCSLA and other applicable laws, to approve, approve with modifications or COAs, or deny the application. BOEM's regulations provide criteria that BOEM will apply in reaching a decision and providing for any applicable COAs.

1.3. Description of the Proposed Action

TGS proposes to conduct a seismic survey utilizing airgun arrays with OBNs and PIES. The OBNs will be placed on the seafloor and recovered using a remote operational vehicle (ROV). TGS is also proposing to place up to 8 PIES on the seafloor during the survey. Up to nine vessels will be utilized for survey activities; the *Eagle Explorer*, the *Sanco Sword*, and the *Sanco Swift* have been designated as source vessels for towing the airgun arrays, the *Olympic Artemis*, the *Island Pride*, the *Armada 8603*, the *Subsea Responder 4,* and the *Chloe Candies* have been designated as receiver vessels for the deployment and retrieval of OBNs and PIES from the seafloor, and the Kolt Levi has been designated as the supply vessel. The proposed activities are located south of Louisiana and Texas in the Central and Western Planning Areas (CPA and WPA). The proposed survey covers 161 OCS blocks in East Breaks, Garden Banks, Alaminos Canyon, and Keathley Canyon.

The area of the proposed action is in water depths ranging from approximately 1,640 to 6,562 feet (ft) (500 to 2,000 meters [m]). Site-specific analysis was completed using TGS' description of the proposed operations; however, specific technical information regarding the G&G activities described in the permit application is proprietary and therefore is not included in this document. The proposed survey is expected to take approximately one year to complete and will begin in August 2026 (TGS, 2026).

3D Seismic Survey Using Ocean Bottom Nodes and Pressure Inverted Echosounders

Seismic surveys using OBNs as receivers involve the placement of OBNs on the seafloor. The OBNs are typically placed using a ROV from a node handling vessel. After deployment, a source vessel towing an airgun array passes along the receivers. The OBNs may remain deployed for a

couple of days to several weeks, depending on the survey's design. After a survey is completed, the sensors are retrieved by an ROV. Each node placement would temporarily affect a small area of the seafloor.

PIES are used for measuring the average speed of sound in the water column. PIES use an up chirp to accurately measure two-way travel-time in the water column. It simultaneously measures pressure at the seafloor. Pressure measurements are converted to depth to find the acoustic distance traveled from the seafloor to the surface and back again. By combining the depth and travel time, the average speed of sound in the water column is calculated (Sonardyne, 2022).

The sound source typically used in most seismic surveys is an airgun array. An airgun array consists of pneumatic devices that produce acoustic output through the rapid release of a volume of compressed air. The airgun array is designed to direct the high energy bursts of low-frequency sound (termed a "shot") downward toward the seafloor. Reflected sounds from below the seafloor are received by an array of sensitive hydrophones on cables (collectively termed "streamers") that are either towed behind a survey vessel, attached to cables/nodes placed on or anchored to the seafloor, or placed within the wellbore during vertical seismic profile surveys. A typical full-scale array produces a source level of 248 to 255 dB re 1 µPa-m (decibels referenced to 1 microPascal at a distance of 1 meter), zero-to-peak (referring to the waveform of the sound pulse). Typical seismic arrays being used in the Gulf produce source levels (sound pressure levels) of approximately 240 dB re 1 µPa-m. While the seismic array pulses are directed toward the ocean bottom, sound can propagate horizontally for several kilometers (Richardson et al., 1995). Measurements of sources at sea (Goold and Fish, 1998; Sodal, 1999) have demonstrated that, although airgun arrays are primarily a source of low-frequency energy, there is also some transmission of energy at higher frequencies. These energies encompass the entire audio frequency range of 20 hertz (Hz) to 20 kilohertz (kHz) (Goold and Fish, 1998) and may extend well into the ultrasonic range up to 50 kHz (Sodal, 1999).

Tuned Pulse Source/Low Impact Seismic Source (TPS/LISS) and Enhanced Frequency Source (EFS)

The proposed airgun array seismic sources are comprised of specially designed, large volume airguns that have a higher air capacity than conventional airguns. These large-volume airguns are designed to emit lower sound frequencies than conventional airguns, in order to produce higher-quality seismic images beneath salt domes. Because the same air volume is used to operate larger airguns, rather than many smaller guns, the proposed array produces lower sound levels than a conventional array of equivalent total volume. The planned impulse spacing is also much larger than that in a conventional 3D survey (25 to 75 m [80 to 246 ft] for a typical survey). As a result, the cumulative sound exposure is also much lower than for a conventional survey. Taken together, these two features of the planned survey result in smaller acoustic radii than for a conventional 3D seismic survey.

2. ALTERNATIVES CONSIDERED

2.1. NO ACTION ALTERNATIVE

Alternative 1 –If this alternative is selected the applicant would not undertake the proposed activity. This alternative might prevent the exploration and development of hydrocarbons or mineral resources, resulting in the potential loss of royalty income and energy resources for the United States.

2.2. PROPOSED ACTION AS SUBMITTED

Alternative 2 – If this alternative is selected the applicant would undertake the proposed activity as requested in the application. No COAs would be required by BOEM.

2.3. PROPOSED ACTION WITH CONDITIONS OF APPROVAL

Alternative 3 – This is BOEM's *Preferred Alternative*. If this alternative is selected the applicant would undertake the proposed activity as requested in the application, but with the COAs identified by BOEM to fully address the site- and project-specific impacts of the proposed action.

2.4. SUMMARY AND COMPARISON OF THE ALTERNATIVES

If selected, Alternative 1, the No Action Alternative, would prevent the applicant from acquiring the proper permits and the subsequent collection of seismic data on the OCS. The information would not be available to industry and government to assist in their evaluation of offshore oil and gas resources, geologic hazards, or potential renewable energy sites in a particular area. Alternative 1 would not result in any impacts to the environmental resources analyzed in **Chapter 3**; however, it does not meet the underlying purpose and need.

If selected, Alternative 2 would allow for the collection of seismic data, as requested in the application, but would not include any additional COAs or monitoring measures applied by BOEM. Alternative 2 meets the underlying purpose and need of the proposed action but could cause unacceptable impacts to the environmental resources analyzed, as described in **Chapter 3** (e.g., hearing loss in marine mammals, injuries to marine mammals and sea turtles from vessel strikes, potential damages to unknown cultural resources and benthic resources on the seafloor). Alternative 2 would not require the implementation of COAs and monitoring measures developed by BOEM to limit the potential for lethal and sublethal impacts to marine mammals and sea turtles.

Alternative 3 is the Preferred Alternative, based on the analysis of potential impacts to resources described in **Chapter 3,** because it meets the underlying purpose and need, and also implements COAs and monitoring measures that adequately limit or negate potential impacts.. The COAs and monitoring measures were identified and will need to be imposed to provide further protection for marine mammals per the 2024 NMFS ITR (NMFS, 2024a). The G&G activities proposed will provide TGS with sufficiently accurate data to determine the location, extent, and properties of potential hydrocarbon or mineral resources. Additionally, the collected data supports BOEM's regulatory and oversight responsibilities while promoting the development of hydrocarbon resources, potentially resulting in increased royalty income as well as energy or mineral resources for the United States.

Other alternatives regarding Agency oversight of the G&G permitting program, identified in the GOM G&G PEIS, were reviewed with the alternatives listed above chosen as reasonable for the current proposed action.

Conditions of Approval Required under the Preferred Alternative

The need for and utility of the COAs and monitoring measures are discussed in the relevant impact analysis sections of this SEA. The following COAs and reporting requirements were identified to ensure adequate environmental protection and post-activity compliance:

- **PROJECT CRITERIA:** The applicant will adhere to the following Project Criteria, as described in the Appendix to this SEA.
    - **GEOPHYSICAL SURVEY PROJECT CRITERIA**
    - **MARINE DEBRIS PROJECT CRITERIA**
    - **VESSEL STRIKE AVOIDANCE AND INJURED AND/OR DEAD AQUATIC PROTECTED SPECIES REPORTING PROJECT CRITERIA**
    - **VESSEL TRANSIT WITHIN THE RICE'S WHALE AREA**
    - **IN-WATER LINE PRECAUTION PROJECT CRITERIA**
    - **MOON POOL MONITORING PROJECT CRITERIA**
    - **SEA TURTLE RESUSCITATION GUIDELINES PROJECT CRITERIA**

- **NON-RECURRING MITIGATION FOR THE PROTECTION OF POTENTIAL ARCHAEOLOGICAL RESOURCES:** This review indicates that at least three archaeological targets existing within the area of the proposed ROV, 3D seismic, and PIES operations within the Federal waters of the Outer OCS. The target locations will require avoidance as listed in the avoidance table appended under separate cover. No operations may be conducted within the avoidance boundary listed in the table. Your accuracy margin-of-error for placement locations should be added to the listed avoidance boundary, to ensure that the area is adequately avoided. If operations fall within currently proposed avoidance boundaries, these locations must either be relocated outside of the avoidance boundaries or removed from the operational design. Alternatively, if you can visually confirm that the target is not a potential archaeological site, further avoidance will not be necessary. Guidance for conducting a visual survey is provided below.

  Significant portions of the project area within the OCS have received either limited or no previous archaeological survey. These areas could contain additional archaeological materials that may be impacted by the proposed operations. All ROV operations must avoid impacting archaeological resources with the tether. One option is to use an ROV Tether Management System (TMS) to minimize entanglement risk and mitigate unnecessary seafloor contact. A second option would be to manually reduce slack in the tether during dive operations. Other options can be used if they are sufficient to actively avoid impacting archaeological sites, but they will need prior review and approval with BOEM archaeology. If you choose to develop your own tether management solution, email archaeology@boem.gov noting your application number in the subject line of the email.

  Following the completion of fieldwork, the applicant must submit as-placed plats, at a scale of 1-inch = 1,000 ft, of all cores relative to the listed target and the avoidance boundary. If remote-sensing survey data is collected for any reason during the course of this project (i.e., side-scan sonar, sector-scan sonar, multi-beam bathymetry, or magnetometer), the applicant must submit copies of these data to BOEM.

  Guidance for conducting an ROV investigation for target clearance

  If the applicant chooses to investigate the target(s) with an ROV, the applicant should collect enough video data to determine if it is a cultural resource (e.g., a sonar image or visual confirmation of an iron, steel, or wooden hull, wooden timbers, anchors, concentrations of human-made objects, such as bottles or ceramics, piles of ballast rock, aircraft wreckage or remains). If the target appears to be a cultural resource as described above, the applicant should document as best as possible the horizontal and vertical extents of the wreck and any associated debris fields. The applicant shall not physically impact the site in any way or remove any artifacts. If the target appears to be a shipwreck or a potential shipwreck, the applicant must continue to avoid it but may reduce the avoidance radius to a minimum of 100 ft from the primary wreck site and any visible debris. If the target is conclusively not a shipwreck, no further avoidance is necessary. All ROV video collected at the target must be submitted to BOEM at the conclusion of fieldwork.

  Please direct any questions or correspondence pertaining to these requirements to Mr. Scott Sorset at (504) 736-2999 or by emailing archaeology@boem.gov.

- **NON-RECURRING MITIGATION BENTHIC COMMUNITIES:** BOEM review of geophysical activities proposed in T25-004 identified confirmed and potential sensitive sessile benthic resources within the proposed node area. According to Notice to Lessees (NTL) 2009-G40, the minimum separation distance for bottom disturbing activities is 76 m (250 ft) from any sensitive sessile benthic community (e.g., deepwater coral, chemosynthetic tube worms). Based on the methods described in the application, BOEM authorizes the applicant to deploy nodes with less than 76 m (250 ft) avoidance of high-density deepwater benthic communities contingent upon the applicant adhering to the mitigations described below:

  1. All seafloor disturbances, including nodes, cables, and ROV, must remain a minimum of 5 m (16 ft) from all **sensitive sessile benthic communities**.

2. The operator must photograph the seabed within a 10 m (33 ft) radius of any node placed within 76 m (250 ft) of **sensitive sessile benthic communities** or a **BOEM anomaly** (June 2019 dataset, see link below). Photographs of each such location shall be taken pre-node deployment, post-node deployment, and post-node retrieval. The photos shall clearly show the geographic location of each node.
3. If any sessile benthic communities are present at a proposed node location, a new site that allows compliance with the above requirements shall be selected.
4. The operator must provide an as-placed GIS shapefile of actual OBN locations to demonstrate compliance. Submit the required photographs and shapefile to the BOEM Regional Supervisor, Office of Resource Evaluation, Data Acquisition and Special Projects Unit, within 90 calendar days after you complete the G&G activity.

Refer to the following BOEM site for GIS data layers of known 3D seismic water bottom anomalies: https://www.boem.gov/Seismic-Water-Bottom-Anomalies-Map-Gallery/

The following feature classes have a high probability of supporting sensitive sessile benthic organisms and shall be avoided unless visual inspection and photographic data confirm an absence of high-density deepwater benthic communities:

1. Anomaly_patchreefs (Shallow Water)
2. Anomaly_confirmed_patchreefs (Shallow Water)
3. Seep_anomaly_positives
4. Seep_anomaly_positives_possible_oil
5. Seep_anomaly_positives_confirmed_oil
6. Seep_anomaly_positives_confirmed_gas
7. Seep_anomaly_confirmed_corals
8. Seep_anomaly_confirmed_organisms
9. Seep_anomaly_confirmed_hydrate
10. Seep_anomaly_confirmed_carbonate
11. Anomaly_Cretaceous
12. Anomaly_Cretaceous_talus

If you have any question regarding this mitigation, please contact Dr. Alicia Caporaso – Benthic Ecology Lead (Alicia.Caporaso@BOEM.gov).

- **MILITARY WARNING AREA COORDINATION**: Our review indicates that the routes to be taken by boats in support of your proposed activities are within Military Warning Areas (MWA) W-147AB, W-147D, W-147E and W-602 shown at: http://www.boem.gov/Environmental-Stewardship/Environmental-Studies/Gulf-of-Mexico-Region/MWA_boundaries-pdf.aspx. You shall contact the appropriate individual military command headquarters concerning the control of electromagnetic emissions and use of boats in each of the areas before commencing your operations. A list of contacts can be found at: http://www.boem.gov/Environmental-Stewardship/Environmental-Studies/Gulf-of-Mexico-Region/Military-Contacts-pdf.aspx.

2.5. ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

A viable alternative is required to be a logical option for carrying out the proposed action, ensure that the purpose of and need can be met, and be feasible under the regulatory directives of the OCSLA and all other applicable guidance. As such, other alternatives regarding Agency oversight of the G&G permitting program, identified in the GOM G&G PEIS, were reviewed with the alternatives listed above chosen as reasonable for the current proposed action. Several other alternatives were considered and reviewed during the coordination of the resource reviews, but they were ultimately dismissed and not analyzed further since they did not meet the aforementioned requirements. The following alternative was considered and given review; however, it was not accepted for the reasons discussed below.

Alternative Requiring Shut-Down Conditions for Delphinids

This analysis also considered whether to apply the shutdown conditions to delphinids. From a biological standpoint, the best available information suggests that delphinids are considered high-frequency specialists (i.e., auditory bandwidth of 150 Hz to 160 kHz) (Southall et al., 2007; 2019; 2021; NMFS, 2024b). Low frequency seismic arrays, such as the one considered for use under this proposed action, generally operate in the frequency range of 20 Hz to 20 kHz (Goold and Fish, 1998) and may extend well into the ultrasonic range up to 50 kHz (Sodal, 1999). Therefore, while the majority of the seismic noise occurs at frequencies below that of delphinids, there are some components that may enter into the hearing range of delphinids (Goold and Fish, 1998). These higher frequency components would be at lower intensity levels (i.e., not as loud). It is unclear, though, from a scientific standpoint whether any of the seismic noise that might be heard by delphinids is in fact disruptive.

Delphinids are known to bow ride on operating seismic vessels. BOEM funded data synthesis studies on the effectiveness of seismic survey mitigation measures and marine mammal observer reports (Barkaszi et al., 2012; Barkaszi and Kelly, 2019) that analyzed protected species observer (PSO) data collected from 2002 to 2008 and 2009 to 2015 in the Gulf. From 2002 to 2008, approximately 58% of all dolphin sightings occurred within the 500 m exclusion zone (now referred to as “shutdown zone”), and of these, 33% were exhibiting bow-riding behavior (Barkaszi et al., 2012). To note, prior to 2014, operators were not requested to specify bow-riding behavior (Barkaszi and Kelly, 2019). Barkaszi and Kelly (2019) found that approximately 67% of dolphin sightings occurred in the 500 m exclusion zone and 68% of all dolphin sightings were recorded as positive for bow-riding. Dolphins’ proclivity for bow-riding likely increases the number of sightings within the 500 m exclusion zone (Barkaszi and Kelly, 2019).

Looking at these records for a typical year (2009), approximately 400 (~27%) were delphinids within the 500 m exclusion zone with operating airguns. In that same year, there were 55 records of shutdowns for whales within the 500 m exclusion zone. If sources had also been shut down for the 400 sightings of delphinids, this would have resulted in a 7-fold increase in the number of shutdowns. There is little doubt then that a shutdown provision for delphinids within the shutdown zone would have a significant impact on seismic operations, such as those under the proposed action.

BOEM next considered whether a provision could be applied to allow for a reasonable exception for bow riding delphinids. For example, a provision could be considered that would allow PSOs to call for a power down (versus immediate shutdown) of the seismic source to the smallest airgun should any delphinid enter, or come close to entering, the 500 m shutdown zone referenced under the Geophysical Survey Project Criteria. If the delphinids leave the shutdown zone or engage in bow riding behavior, then the PSO could call for the immediate return of the array to full power. This would allow for an opportunity for the PSO to determine if the behavior of the animal(s) warranted a shutdown and if not would allow the applicant to return to full power more quickly (versus a shutdown followed by a 30-minute clearance of the zone and a no less than 20-minute ramp up procedure).

Based on the PSO sighting records, it is clear that shutdowns for delphinids would result in an impact to industry activities. Unlike other sound producing activities (e.g., sonar), seismic surveys occur on specified tracklines that need to be followed in order to meet the data quality objectives of the survey. In other words, seismic vessels in operation cannot simply divert away from nearby marine mammals without a loss in data quality. As stated above, an analysis of 2009 PSO data (Barkaszi et al., 2012) indicates that if shutdowns for delphinids within the shutdown zone were employed, there would have been a 7-fold increase in shutdowns of seismic arrays that year. Shutdowns of 30 minutes or longer would have required an additional 30-minute observation period to ensure animals have left the exclusion area followed by a no less than 20-minute ramp up procedure. In all likelihood, these shutdowns would then have required the applicants to return to an earlier point in the track line and resurvey the area again. This not only results in substantially more expense in downtime and repositioning of seismic arrays and streamers but would also likely increase the duration of and amount of total seismic noise for each affected survey area.

Conclusion

Based on the analysis above, BOEM believes it is essential to more fully investigate and vet the application of shutdown conditions to delphinids before requiring it as a COA (under Alternative 3) or considering it as an additional alternative to the proposed action. It is BOEM's intention, therefore, to fully analyze the application of this COA.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

3.1. INTRODUCTION

The discussion below will: (1) describe/summarize the pertinent potentially affected resources; (2) determine whether the proposed G&G activities and their impact-producing factors (IPF) will have significant impacts on the marine, coastal, or human environments; and (3) identify significant impacts, if any, that may require further NEPA analysis in an EIS. The description of the affected environment and impact analysis are presented together in this section for each resource.

For each potentially affected resource, BOEM staff reviewed and analyzed all currently available peer-reviewed literature and integrated these data and findings into the analyses below. The analyses cite the best available, relevant scientific literature. BOEM performed this analysis to determine whether TGS' proposed survey activities will significantly impact the marine, coastal, or human environments. For the impact analysis, resource-specific significance criteria were developed for each category of the affected environment. The criteria for impacts to environmental resources are generally classified into one of the three following levels:

- ***Significant Adverse Impact*** (including those that could be mitigated to nonsignificance)
- ***Adverse but Not Significant Impact***
- ***Negligible Impact***.

Preliminary screening for this assessment was based on a review of previous SEAs, relevant NEPA compliance documents, and relevant literature pertinent to historic and projected activities. BOEM initially considered the following resources for impact analysis:

- marine mammals, including Endangered Species Act (ESA) listed species and strategic stocks
- sea turtles (all are ESA listed species)
- fishes, including listed species and ichthyoplankton
- commercial and recreational fisheries
- coastal and marine birds, including ESA listed species
- benthic communities
- archaeological resources
- military uses
- recreational and commercial diving
- marine transportation
- geology/sediments
- air and water quality.

In the GOM G&G PEIS, the impact analysis focused on a broad group of G&G activities (including other survey types) and resources with the potential for non-negligible impacts. First, a matrix identifies impact agents associated with each type of G&G activity. The IPFs include: (1) active acoustic sound sources, (2) vessel and equipment noise, (3) vessel traffic, (4) aircraft traffic and noise, (5) stand-off distance, (6) vessel discharges, (7) trash and debris, (8) seafloor disturbance, (9) drilling discharges, (10) entanglement, and (11) accidental fuel spills. The preliminary analysis in the GOM G&G PEIS considers surveys of the type proposed by TGS as well as impacts to

resources by type of activity. To assist with subsequent coordination, the GOM G&G PEIS' analysis further defines the level of impact associated with each interaction as follows:

- **Nominal:** little or no measurable/detectable impact
- **Minor**: impacts are detectable, short term, extensive or localized, but less than severe
- **Moderate**: impacts are detectable, short term, extensive, and severe; or impacts are detectable, short term or long lasting, localized, and severe; or impacts are detectable, long lasting, extensive or localized, but less than severe
- **Major**: impacts are detectable, long lasting, extensive, and severe.

The GOM G&G PEIS notes that G&G surveys have historically covered a large area of the region each year and, when unmitigated, have the greatest potential for "significant" impacts to protected and other sensitive marine species in comparison with other OCSLA-approved activities, including, but not limited to, exploration and development drilling. Further, it acknowledges increasing concerns in the regulatory and scientific communities regarding acoustic impacts on marine life, including marine mammals, turtles, and fishes. Species of particular concern are those whose hearing capabilities (based on vocalization characteristics) fall within the low frequencies introduced into the marine environment by G&G activities. The GOM G&G PEIS provides a comprehensive characterization of biological resources that may be adversely affected by G&G activities. This information is summarized in the various resource-specific descriptions of the affected environment and impact analyses in the chapters that follow.

However, for the purposes of this SEA, BOEM has not included analyses on resource areas that were evaluated and considered under the GOM G&G PEIS as having nominal impacts or determined the resource would not be impacted by the proposed action. Such a procedure is consistent with the NEPA concept of tiering. Additionally, since no expansion or modification of support bases or related vessel construction work are proposed as a result of this activity, socioeconomic effects were not analyzed due to the type, the temporary nature, and employment size of the survey activity. The most recent evaluation of the best available peer-reviewed scientific literature continues to support this conclusion for the following resource categories:

- commercial and recreational fisheries
- coastal and marine birds, including ESA listed species
- recreational and commercial diving
- marine transportation
- geology/sediments
- air and water quality

For this SEA, BOEM evaluated the potential impacts from the applicant's proposed G&G activities on the following resource categories:

- marine mammals, including threatened/endangered and non-ESA listed species
- sea turtles (all are ESA listed species)
- fish and fisheries, including listed species and ichthyoplankton
- benthic communities
- archaeological resources
- other users of the OCS (space-use conflicts with military uses)

3.2. MARINE MAMMALS

3.2.1. Description

The marine mammal community is diverse and distributed throughout the northern Gulf waters. The marine mammals are represented by members of the taxonomic order Cetacea, including suborders Mysticeti (i.e., baleen whales) and Odontoceti (i.e., toothed whales), as well as the order Sirenia (i.e., manatee). Twenty-one species of cetaceans and one species of Sirenia

regularly occur in the region and are identified in the NMFS Gulf of Mexico Stock Assessment Reports (Hayes et al., 2024). A complete description of marine mammals can be found in the relevant NEPA compliance documents and is incorporated by reference.

Threatened or Endangered Marine Mammal Species

Only two cetaceans, the sperm whale (*Physeter macrocephalus*) and the Rice's whale (*Balaenoptera ricei*) (previously named the GOM Bryde's whale [*Balaenoptera edeni*]), regularly occur in the region and are listed as endangered under the ESA. The Florida manatee (*Trichechus manatus latirostris*), a subspecies of the West Indian manatee (*Trichechus manatus*), has been documented all along the Gulf in nearshore waters, typically less than 4 m (13 ft) deep and within 1,000 m (328 ft) of the shore (Slone et al., 2022). West Indian manatees are currently listed as threatened. However, the Florida manatee subspecies is proposed to be listed as threatened, and the Antillean manatee (*Trichechus manatus manatus*) subspecies as endangered, which would replace the listing of the West Indian manatee (FWS, 2025). The sperm whale was listed as endangered throughout its range on December 2, 1970. The GOM Bryde's (now Rice's) whale was listed as endangered on May 15, 2019 (NMFS, 2019). The Rice's whale critical habitat is currently proposed by NMFS in the northern Gulf from the 100 to 400 m (328 to 1,312 ft) isobath (NMFS, 2023c).

The only commonly occurring baleen whale in the northern Gulf is the Rice's whale. The majority of Rice's whale detections are limited to the northeastern Gulf along the continental shelf between roughly 100 and 400 m depths (Garrison et al., 2024; NOAA Fisheries, 2025), though there have been some detections outside of this area in the northwestern and northcentral Gulf (Soldevilla et al., 2022; Rappucci et al., 2023; Soldevilla et al., 2024; NOAA Fisheries, 2024). Predicted densities and occurrence of Rice's whales remain highest in their northeastern Gulf habitat (Farmer et al., 2022; Garrison et al., 2024). Sperm whales in the Gulf are not evenly distributed, showing greater densities in areas associated with oceanic features that provide the best foraging opportunities (Garrison et al., 2018).

Non-ESA-Listed Marine Mammal Species

Nineteen toothed cetaceans (including beaked whales and dolphins) regularly occur in the region but are not ESA-listed. Despite being non-listed, the Marine Mammal Protection Act (MMPA) of 1972 protects all marine mammals.

Unusual Mortality Events (UME)

An UME is defined under the MMPA as a "stranding that is unexpected, involves a significant die-off of any marine mammal population, and demands immediate response." A list of active and closed UMEs with updated information can be found at: https://www.fisheries.noaa.gov/national/marine-life-distress/active-and-closed-unusual-mortality-events. There are currently no active UMEs in the Gulf.

Marine Mammal Hearing

Marine mammals are highly dependent on acoustic cues as a primary means of communicating and assessing their environment. For example, toothed whales use echolocation clicks to navigate their surroundings and locate prey, demonstrating the sophisticated use of sound in their ecological interactions (Madsen and Surlykke, 2013). An animal's auditory sensitivity to a sound depends on the spectral, temporal, and amplitude characteristics of the sound (Richardson et al., 1995). Baleen whales (i.e., Rice's whales) are classified within the low-frequency cetacean (LFC) hearing group (7 Hz to 36 kHz); dolphins, beaked whales, and toothed whales (e.g., sperm whales) are classified within the high-frequency cetacean (HFC) hearing group (150 Hz to 160 kHz); and *Kogia* are classified within the very high-frequency (VHF) cetacean hearing group (200 Hz to 165 kHz) (NMFS, 2024b).

3.2.2. Impact Analysis

The IPFs associated with the proposed action that could affect marine mammals are primarily active acoustic sound sources and vessel noise from survey activities, collisions with survey

vessels, and marine trash and debris. The GOM G&G PEIS contains a discussion of the potential impacts from survey operations on marine mammal resources. Additional information about routine impacts from oil and gas activity on marine mammals is addressed in the relevant NEPA compliance documents. The discussions are summarized below and are incorporated by reference into this SEA.

3.2.2.1. Alternative 1

If Alternative 1, the No Action Alternative, is selected the applicant would not undertake the proposed activities; therefore, the IPFs to marine mammals would not occur. For example, there would be no vessel noise or seismic airgun noise that would result in behavioral change, masking, or non-auditory effects to marine mammals, no long-term or permanent displacement of the animals from preferred habitats, and no destruction or adverse modification of any habitats. In addition, there would be no survey related debris that could result in endangerment to marine mammals and no additional vessel traffic related to the survey activities, so there would be no risk of collisions with marine mammals.

3.2.2.2. Alternative 2

If Alternative 2, the Proposed Action as Submitted, is selected the applicant would undertake the proposed activities as requested and conditioned in the application. Examples of potential impacts to marine mammals without implementation of the COAs include, but are not limited to, injury from vessel strikes, hearing loss from seismic noise, disruption of feeding and other behaviors from seismic noise and vessel presence, and exposure to marine trash and debris. This Alternative would not adequately limit or negate potential impacts to marine mammals.

3.2.2.3. Alternative 3

If Alternative 3, the Proposed Action with COAs, is selected the applicant would undertake the proposed activities as requested and conditioned in the application; however, the applicant would be required to undertake COAs as identified by BOEM. For the reasons set forth below, inclusion of these measures under Alternative 3 limits or minimizes potential impacts to marine mammals.

Potential Impacts to Marine Mammals from Active Acoustic Sound Sources

In 2018, BOEM and NMFS began collaborating to improve efficiency and consistency in joint ESA Section 7 consultations, MMPA authorizations, and BOEM permits related to the oil and gas program and other program areas. The effort was designed to specifically address actions for which the two agencies have regulatory authority, and those that would have the greatest long-term impact to increase efficiency, resolve regulatory issues, and complete actions. From this effort, a peer-reviewed technical paper analyzing active acoustic sources and ascribing them to tiers based on potential level of impact to marine mammals was developed and published (Ruppel et al., 2022). An encyclopedic-like resource describing the sound sources and how they are typically used by different industries was also published (BOEM, 2023). Jointly developed standard operational protocols which already incorporated tiers for mitigating and monitoring the effects of geophysical surveys, including those from seismic airguns and HRG equipment, are found in the Geophysical Survey Project Criteria, with *de minimis* (i.e., unlikely to result in incidental take) activity characterized (Tier 4).

The potential for noise impacts from anthropogenic sound sources on marine mammals is highly variable and depends on the specific circumstances of a given situation (Nowacek et al., 2007; Southall et al., 2007; 2019; 2021; Erbe et al., 2025). The potential effects of underwater sound from an active acoustic source could result in auditory injury, permanent threshold shift (PTS), temporary threshold shift (TTS), behavioral disturbance, stress, masking, and nonauditory physical or physiological effects (Nowacek et al., 2007; Southall et al., 2007; 2019; 2021; Erbe et al., 2025). The degree of the potential impact depends on the species' hearing frequency, sound characteristics, received level, distance of the animal from the sound source, and duration of the sound exposure.

Because most of the energy from airguns is radiated at frequencies below 200 Hz, low-frequency cetaceans (e.g., Rice's whales) would most likely hear the acoustic source since it falls within their hearing range. High-frequency cetaceans (e.g., sperm whales and beaked whales) have auditory bandwidths that partially overlap with the frequencies of maximum airgun output. Further, because mysticetes (e.g., Rice's whales) produce calls that span a low-frequency range (20 Hz to 30 kHz) with their best hearing abilities presumably falling into this range as well, they would be most likely to experience impacts from the low-frequency sounds produced by seismic surveys (Richardson et al., 1995). In contrast, odontocetes produce calls and hear best at mid to high frequencies (Richardson et al., 1995) and appear less vulnerable to low-frequency sound sources than mysticetes. There is evidence that some whales' closest points of approach to airgun arrays during seismic operations are substantially farther during full-power operations than during silence, indicating that there may be some avoidance response to the full-power operations (Barkaszi and Kelly, 2019).

BOEM applies the Geophysical Survey Project Criteria to mitigate effects of noises less than 180 kHz and requires PSOs. Under this criteria, airguns are categorized as Tier 1 or 2, depending on total volume. Sources having transmission frequencies higher than 180 kHz are deemed inaudible by marine mammals and therefore their effects are considered *de minimis* (Ruppel et al., 2022). With the application of protocols requiring vessels to maintain distances from marine mammals if within a specific Tier (when applicable) or shutdown of airgun source, the potential for impacts to marine mammals from G&G surveys is reduced or eliminated. The primary impacts expected are behavioral and short-term due to the transient nature of the sound source, and the wide-ranging distributions and movements of marine mammals in the Gulf.

By selecting Alternative 3, the operator is required to follow the Geophysical Survey Project Criteria and 2024 NMFS ITR. With these criteria in place, the impacts to marine mammals are determined to be **nominal** to **minor**.

Potential Impacts to Marine Mammals from Vessel Noise

Vessel noise from the proposed action will produce low levels of noise, generally in the 150 to 170 dB re 1 µPa-m at frequencies below 1,000 Hz. Vessel and equipment noises are transitory and generally do not propagate at great distances from the vessel. The intensity of noise from service vessels is roughly related to ship size and speed (Erbe et al., 2019). For a given vessel, relative noise tends to increase with increasing speed. Seismic operations with towed gear generally are conducted at relatively slow speeds of 4 to 6 knots, with a maximum speed of less than 8 knots. A comprehensive review of the literature on marine mammals and vessel noise (Erbe et al., 2019; 2025) revealed that changes in behavior vary widely across species and are heavily dependent on context. Vessel noise could interfere with marine mammal communication either by masking important sounds from conspecifics (a member of the same species), masking sounds from predators, or it may trigger animals to alter their vocalizations (Tyack, 2008). There is the possibility of short-term disruption of movement patterns and/or behavior caused by vessel noise and disturbance. The behavioral disruptions potentially caused by noise and the presence of vessel traffic will therefore have **nominal** effects on cetacean populations in the northern Gulf.

Potential Impacts to Marine Mammals from Vessel Traffic

All marine mammals are vulnerable to accidental vessel strike. However, some marine mammal species may be more vulnerable than others to possible vessel strike with all vessels operating at speed, including primarily slow-moving species (e.g., manatees) or those that spend extended periods of time at the surface (e.g., Rice's whales), and deep-diving species (e.g., sperm whales) while on the surface (Vanderlaan and Taggart, 2007). For example, Rice's whales may spend up to 88 percent of their time at night, and 70 percent of their time overall, within 15 m (39 ft) of the ocean surface (Soldevilla et al., 2017), making them vulnerable to collisions with large vessels (Stevens et al., 2024).

Accidental vessel strike on a marine mammal can result in injury, mortality, or no apparent injury (Laist et al., 2001; Van Waerebeek et al., 2007; Vanderlaan and Taggart, 2007; Pace, 2011). Three fundamental components are essential to understanding and assessing vessel strike risk to any marine mammal population: 1) distribution, occurrence, and habitat selection of the

population; 2) dive and surface behavior of individuals; and 3) vessel characteristics, activity, and mitigation measures (Stevens et al., 2024). Further, several factors affect the risk and severity of vessel strike to marine mammals, including species type, speed, health, and behavior of the animal and the path, speed, size, and number of vessels (Laist et al., 2001; Vanderlaan and Taggart, 2007; Martin et al., 2016). Vessel speed and vessel size are of note when assessing strike risk (Stevens et al., 2024; Garrison et al., 2025). Most global reports of vessels striking marine mammals involve large whales, though strikes with smaller species also occur (Van Waerebeek et al., 2007). Most severe and lethal whale injuries involve large ships (>80 m [262 ft]) at higher speeds. Eighty-nine percent of ship strike records show that vessels were moving at greater than 14 knots, most strikes occurred over or near the continental shelf, and the whales were usually not seen beforehand or were seen too late to be avoided (Laist et al., 2001; Van Waerebeek et al., 2007). Seismic operations with towed gear generally are conducted at relatively slow speeds of 4 to 6 knots, with a maximum speed of less than 8 knots.

The proposed activities are located outside of the area where the Rice's whale is likely to be present. The operator has not proposed any service vessels or vessel traffic within the Rice's whale area. Under Alternative 3, the operator is required to provide notification and concurrence to fulfill the Rice's Whale reporting requirements to BOEM and BSEE prior to any vessel transit changes, per the Vessel Transit within the Rice's Whale Area as identified in the 2020 RWA. The operator is also required to follow the Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Project Criteria, which would prevent or substantially reduce marine mammal interactions with vessels by requiring separation distances, speed restrictions, and the use of onboard observers for monitoring during certain activities. NMFS also provides all boat operators with whale watching guidelines, which are derived from the MMPA. These guidelines suggest safe navigational practices based on speed and distance limitations when encountering marine mammals. With these project criteria in place and considering the wide range of marine mammals in the Gulf, the impacts to marine mammals are determined to be **nominal** to **moderate**[1].

Potential Impacts to Marine Mammals from Marine Trash and Debris

Marine debris, such as plastics, can affect marine mammals through entanglement and/or ingestion (e.g., choking or intestinal blockage) (Gall and Thompson, 2015). Entanglement in marine debris could lead to injury, infection, reduced mobility, increased susceptibility to predation, decreased feeding ability, fitness consequences, and mortality (e.g., drowning) (Gall and Thompson, 2015). In addition, marine debris ingestion could lead to intestinal blockage, which can impact feeding ability and lead to injury or death (Senko et al., 2020). The discharge of marine debris by the offshore oil and gas industry and supporting activities is subject to several laws and treaties. By selecting Alternative 3, the operator is required to follow the Marine Debris Project Criteria, which is designed to prevent or minimize accidental marine debris. With this criteria in place, the impacts to marine mammals are determined to be **nominal**.

Conclusion

Seismic noise has the potential, individually or cumulatively, to result in impacts to marine mammal species commonly found in the proposed action area. However, BOEM finds that the potential for such effects from the proposed action is unlikely to rise to significant levels for the following reasons:

- Mysticetes, as low-frequency hearing specialists, are the species group most likely to be susceptible to impacts from non-pulse sound (intermittent or continuous) given that their hearing ranges overlap most closely with the noise frequencies produced from G&G survey-related noise (Richardson et al., 1995; Southall et al., 2007; 2019; 2021). However, most mysticeti species that may occur in the Gulf (i.e., North Atlantic right, blue, fin, sei, humpback, and minke) are considered either extralimital, rare, or uncommon within the region (Hayes et

[1] In the unlikely (i.e., not reasonably foreseeable) event of a strike on an ESA-listed whale that results in mortality, the determination could be major.

al., 2024). The only commonly occurring baleen whale in the northern Gulf is the Rice's whale, which is mostly found in the northeastern Gulf. Given the small geographic scope of the proposed action, as well as the operator proposing no survey activity or service vessels through the Rice's whale area, the presence of these species within the action area is unlikely. The potential for significant impacts is prevented or minimized given the implementation of the Geophysical Survey Project Criteria under Alternative 3.

- Manatees are typically uncommon in the proposed action area, though some deepwater sightings have occurred. As they predominantly inhabit only coastal marine, brackish, and freshwater areas, they are not expected to occur regularly in the area of the proposed action.
- The remaining marine mammal species in the Gulf are considered either HFC hearing specialists (e.g., sperm whales, beaked whales, and dolphins) with hearing ranges that partially overlap with the frequencies of maximum airgun output (Richardson et al., 1995; Southall et al., 2007; 2019; 2021) or VHF hearing specialists (e.g., *Kogia* spp.). Therefore, the potential for seismic noise produced from this proposed action to cause auditory and non-auditory effects, PTS, TTS, behavioral changes, or masking on these species is further limited.
- BOEM requires Project Criteria under Alternative 3 and the 2024 NMFS ITR. The protcols are expected to prevent or minimize duration of exposure to G&G survey-related noise when implemented in accordance with NMFS Incidental Take Authorizations (ITA) under the MMPA.

Given the scope, timing, and transitory nature of the proposed action and adherence to the COAs, the noise related to the proposed seismic survey is not expected to result in PTS, TTS, behavioral change, masking, or non-auditory effects to marine mammals that would rise to the level of significance. The geographic scope of the proposed action is small in relation to the ranges of marine mammals. The proposed survey activities are not expected to cause long-term or permanent displacement of the animals from preferred habitats, nor will they result in the destruction or adverse modification of any habitats. The operator is required to follow the Geophysical Survey Project Criteria, which will prevent or minimize/negate potential acoustic impacts to marine mammals. Survey activities will involve limited slow-moving vessel traffic related to the towing of the airgun array that carries some risk of collisions; however, animals may avoid the moving vessels, reducing the likelihood of collision. BOEM has adopted requirements to prevent or minimize/negate the chance of vessel strike to marine mammals with the Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Project Criteria. Also, BOEM has adopted requirements to prevent or minimize/negate the chance of marine trash and debris impacts to marine mammals with the Marine Debris Project Criteria.

3.2.3. Cumulative Impact Analysis

The relevant NEPA compliance documents address the cumulative impacts on marine mammals as a result of oil and gas leasing, exploration, development and production activities, including G&G activities.

Activities considered under the cumulative scenario which include the oil and gas program and other anthropogenic and natural activities, including the proposed action, may affect protected marine mammals or critical habitat. Marine mammals could be impacted by the degradation of water quality resulting from operational discharges; vessel traffic; noise generated by platforms, drilling rigs, helicopters, vessels, and G&G surveys; explosive structure removals; oil spills; oil-spill-response activities; loss of debris from service vessels and OCS structures; commercial fishing; capture and removal; and pathogens. The cumulative impact on marine mammals is expected to result in a number of chronic and sporadic sublethal effects (i.e., behavioral effects and nonfatal exposure to or intake of OCS-related contaminants or discarded debris) that may stress and/or weaken individuals of a local group or population and predispose them to infection from natural or anthropogenic sources.

Few deaths may occur from chance vessel collisions, ingestion of plastic material, commercial fishing, and pathogens. Disturbance (noise from vessel traffic and survey operations, etc.) and/or exposure to sublethal levels of toxins and anthropogenic contaminants may stress animals, weaken their immune systems, and make them more vulnerable to parasites and diseases that

normally would not be fatal. The net result of any disturbance will depend upon the size and percentage of the population likely to be affected, the ecological importance of the disturbed area, the environmental and biological parameters that influence an animal's sensitivity to disturbance and stress, or the accommodation time in response to prolonged disturbance (Geraci and St. Aubin, 1980). Natural phenomena such as tropical storms and hurricanes do occur in the region, though impacts remain difficult to quantify.

Incremental effects from the proposed action on marine mammals are expected to be **nominal** for vessel noise and marine trash and debris and **nominal** to **minor** for active acoustic sound sources. Incremental effects from the proposed action on marine mammals are expected to be **nominal** to **moderate** for vessel strike, though not rise to the level of significance because of the limited scope, duration, and geographic area of the proposed action, the wide-ranging movements of marine mammals in the Gulf, and adherence to the Project Criteria.

Conclusion

The effects of the proposed action, when viewed in light of the effects associated with other relevant activities, may impact marine mammals. With the implementation of the required COAs for seismic survey and vessel operations under Alternative 3, as well as the limited scope, timing, and geographic location of the proposed action, and considering the wide range of marine mammals in the Gulf, effects from the proposed survey activities on marine mammals will be **nominal** for vessel noise, marine trash and debris, **nominal** to **minor** for active acoustic sound sources, and **nominal** to **moderate** for vessel strike. For animals that may be continuing to experience stress/sublethal impacts from natural or anthropogenic stressors, adherence to the Project Criteria should act to further reduce impacts and provide an abundance of precaution.

3.3. SEA TURTLES

3.3.1. Description

The life history, population dynamics, status, distribution, behavior, and habitat use of sea turtles can be found in the relevant NEPA compliance documents and are incorporated by reference into this SEA. Of the extant species of sea turtles, five are known to inhabit the waters of the region (Pritchard, 1997): the leatherback (*Dermochelys coriacea*), green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), Kemp's ridley (*Lepidochelys kempii*), and loggerhead (*Caretta caretta*). These five species are all highly migratory, and individual animals will migrate into nearshore waters as well as other areas of the North Atlantic Ocean, Gulf, and Caribbean Sea. Garrison et al. (2020) found that spatial and seasonal variation in loggerheads in the northern Gulf represents the shift in habitats and behavioral modes across seasons, with animals moving into deeper waters and spending progressively less time at the surface during cooler months. Further, Lamont and Hart (2023) found that time at the surface was greater for loggerhead, Kemp's ridley, and green turtles in summer, though did not differ between BOEM's Eastern Planning Area (EPA) and Central Planning Area (CPA), except for Kemp's ridleys, which spent more time at the surface in the WPA than the EPA.

All five species of sea turtles found in the Gulf have been federally listed as endangered or threatened since the 1970s. The North Atlantic Distinct Population Segment (DPS) of green turtle is ESA-listed as threatened. Hawksbill turtles, Kemp's ridley turtles, leatherback turtles, and the Northwest Atlantic Ocean DPS of loggerhead turtle are ESA-listed as endangered. Floating *Sargassum* patches are federally designated under the ESA as critical habitat for loggerhead turtles (NMFS, 2014) and proposed for green turtles (NMFS, 2023b).

Sea Turtle Hearing

There is limited data available on sea turtle hearing abilities. While the general importance of sound to sea turtles is not well understood, there is a growing body of knowledge suggesting that sea turtles use sound in a multitude of ways. Sea turtles may use sound for navigation, locating prey or preferred habitat, predator avoidance, and environmental awareness (Piniak et al., 2016). There are few studies reporting sound production in sea turtles, despite their ability to hear sounds in both air and water. In general, sea turtles hear best in water at levels between 100 to 750 Hz,

do not hear well above 1 kHz, and are generally less sensitive to sound than marine mammals (Papale et al., 2020; Reese et al., 2023).

3.3.2. Impact Analysis

The diversity of a sea turtle's life history leaves it susceptible to many natural and human impacts, including impacts while it is on land, in the benthic environment, and in the pelagic environment. The IPFs associated with the proposed action that could affect sea turtles include (1) active acoustic sound sources, (2) vessel noise, (3) vessel traffic, and (4) marine trash and debris. The GOM G&G PEIS contains a discussion of the potential impacts from survey operations on sea turtles (BOEM, 2017). Additional information about routine impacts from oil and gas activity on sea turtles is addressed in the relevant NEPA compliance documents. The discussions are summarized below and are incorporated by reference into this SEA.

3.3.2.1. Alternative 1

If Alternative 1, the No Action Alternative, is selected the applicant would not undertake the proposed activities; therefore, the IPFs to sea turtles would not occur. For example, there would be no vessel noise or seismic airgun noise that would result in behavioral change, masking, or non-auditory effects to sea turtles, no long-term or permanent displacement of the animals from preferred habitats, and no destruction or adverse modification of any habitats. Since there would be no vessel traffic related to the towing of the airgun array, there would be no risk of collisions with sea turtles.

3.3.2.2. Alternative 2

If Alternative 2, the Proposed Action as Submitted, is selected the applicant would undertake the proposed activities as requested and conditioned in the application. Examples of potential impacts to sea turtles without implementation of the COAs include, but are not limited to, exposure to marine trash and debris, potential hearing impacts from active acoustic sound sources, injury from vessel traffic, and disruption of feeding and other behaviors from vessel presence. This Alternative would not adequately limit or negate potential impacts to sea turtles.

3.3.2.3. Alternative 3

If Alternative 3, the Proposed Action with COAs, is selected the applicant would undertake the proposed activities as requested and conditioned in the application; however, the applicant would be required to undertake COAs identified by BOEM. For the reasons set forth below, inclusion of these measures under Alternative 3 limits or negates potential impacts to sea turtles.

Potential Impacts to Sea Turtles from Active Acoustic Sound Sources

Noise associated with G&G activities may result in behavioral effects (e.g., changes in direction or swimming speed) or auditory masking in sea turtles. The most likely impacts on sea turtles are expected to be short-term behavioral responses. Studies have demonstrated avoidance behavior of sea turtles to seismic surveys (O'Hara and Wilcox, 1990; Lenhardt, 1994; McCauley et al., 2000a; Piniak, 2012). Sea turtles may alter their behaviors when a seismic vessel approaches, and thereby suspend feeding, resting, or interacting with conspecifics. Such disruptions are expected to be temporary, however, and are not expected to impact the overall survival and reproduction of individual turtles. Seismic operations have the potential to permanently injure sea turtles in close proximity to active airgun arrays (Popper et al., 2014). Subadult and adult turtles may be more likely to be affected by seismic airgun noise than post-hatchling turtles because of the time that they remain submerged at depth. Post-hatchling turtles generally reside at or near the sea surface and may be less likely to be injured by the sound field produced by an airgun array projecting directionally downward. Sea turtles have been observed to dive immediately following airgun shots, suggesting an avoidance response. Few data are recorded about the potential direct physical injury to turtles from seismic surveys (Nelms et al., 2016).

Airguns are categorized as Tier 1 or 2 (per the Geophysical Survey Project Criteria) depending on total volume. Tier 1 sound sources are high energy surveys that would likely require mitigation and monitoring. Tier 2 sound sources are low to intermediate energy sources. Tier 2 sources are

expected to have significantly fewer effects than Tier 1 sources. BOEM applies the Geophysical Survey Project Criteria to mitigate effects of noises less than 180 kHz and requires PSOs. The application of project criteria requiring vessels to maintain distances from sea turtles when applicable or mandatory pause of airgun sources would prevent or reduce the potential for impacts. Therefore, potential impacts to sea turtles from seismic surveys are unlikely if sufficiently distanced from the sound source. Given the scope, timing, and transitory nature of the proposed action, the wide-ranging movements of sea turtles in the Gulf, the implementation of the Geophysical Survey Project Criteria, and that the best available information indicates that sea turtles do not appear to use environmental sound heavily to meet daily needs for survival, the effects to sea turtles from seismic noise are expected to be **nominal** to **minor**.

Potential Impacts to Sea Turtles from Vessel Noise

The dominant source of noise from vessels is propeller operation, and the intensity of this noise is largely related to ship size and speed. Seismic operations with towed gear generally are conducted at relatively slow speeds of 4 to 6 knots, with a maximum speed of less than 8 knots. Vessel noise from the proposed action would produce low levels of noise, generally in the 150 to 170 dB re 1 µPa-m at frequencies below 1,000 Hz. Vessel and equipment noises are transitory and generally does not propagate at great distances from the vessel. There is no information regarding the long-term consequences that vessel noise may have on sea turtles. Hazel et al. (2007) demonstrated that sea turtles appear to respond behaviorally only to vessels at approximately 33 ft (10 m) or closer. Noise from service vessel activity may elicit a startle response from sea turtles, and there is the possibility of short-term disruption of activity patterns and temporary sublethal stress (National Research Council, 1990). It is conservative to assume that noise associated with survey vessels may elicit behavioral changes, such as evasive maneuvers, in individual sea turtles. The most likely effects of vessel noise on sea turtles could include short-term behavioral changes and possibly auditory masking. Based on the best available information, vessel noise is not expected to significantly disrupt normal behavior patterns in sea turtles that include, but are not limited to, breeding, feeding, or sheltering. Further, vessel noises generated by the proposed action will be localized and short term. It is not expected that vessel noise will have any detectable effect on biologically important behaviors of sea turtles. The effects to sea turtles from vessel noise are therefore expected to be **nominal**.

Potential Impacts to Sea Turtles from Vessel Traffic

Sea turtles are vulnerable to vessel strikes due to the time they spend at the ocean surface. Limited data are available concerning potential sea turtle impacts from vessel strikes due to a lack of studies and the challenges with detecting such impacts (Nelms et al., 2016). Nonetheless, strikes from all types of vessels are known to result in sea turtle injury and mortality in the Gulf (Lutcavage et al., 1997; Work et al., 2010; Nelms et al., 2016). If a sea turtle is struck by a vessel, no apparent injury, minor non-lethal injury, serious injury, or mortality can occur with the associated effects varying based on the size and speed of the vessel. Seismic operations with towed gear generally are conducted at relatively slow speeds of 4 to 6 knots, with a maximum speed of less than 8 knots.

To prevent or minimize the potential for vessel strikes, BOEM requires operators to implement the Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Project Criteria, which contains vessel strike avoidance measures for sea turtles and other protected species. As per the required reporting under the Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Project Criteria, BOEM requires that any operator immediately report the striking of any animal. To date, there have been no reported strikes of sea turtles by G&G survey vessels; however, collisions with small or submerged sea turtles may go undetected. Given the scope, timing, and transitory nature of the proposed action, the wide-ranging movements of sea turtles in the Gulf, and adherence to the COAs, effects to sea turtles from vessel collisions are expected to be **nominal** to **minor**.

Potential Impacts to Sea Turtles from Marine Trash and Debris

Marine debris affects sea turtles primarily through entanglement and/or ingestion (e.g., choking or intestinal blockage) (Gall and Thompson, 2015). Entanglement in marine debris could lead to

injury, infection, reduced mobility, increased susceptibility to predation, decreased feeding ability, fitness consequences, and/or mortality (e.g., drowning) of sea turtles (Gall and Thompson, 2015). Marine debris ingestion could lead to intestinal blockage, which can impact feeding ability and lead to injury or death (Senko et al., 2020). The discharge of marine debris by the offshore oil and gas industry and supporting activities is subject to several laws and treaties. By selecting Alternative 3, the operator is required to follow the Marine Debris Project Criteria, which is designed to prevent or minimize accidental marine debris. With this COA in place, the impacts to sea turtles are determined to be **nominal**.

Conclusion

The sections above discuss sea turtle hearing in general and the potential range of effects to sea turtles from the proposed action, including (1) active acoustic sound sources, (2) vessel noise, (3) vessel traffic, and (4) marine trash and debris.

Effects of seismic noise on sea turtles will not rise to the level of significance for the following reasons:

- The best available scientific information indicates that sea turtles do not greatly use sound in the environment for survival; therefore, disruptions in environmental sound would have little effect.
- BOEM instituted the Geophysical Survey Project Criteria. The project criteria are expected to prevent or minimize duration of exposure to sounds above threshold.
- The scope, timing, and transitory nature of the proposed action will produce limited amounts of seismic noise in the environment.

Effects of vessel noise on sea turtles are considered discountable. The risk of impacts from marine trash and debris would not rise to the level of significance given that BOEM requires compliance with Marine Debris Project Criteria. The risk of collisions between sea turtles and vessels associated with the proposed action exists but would not rise to the level of significance given:

- BOEM requires compliance with the Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Project Criteria, which provides guidelines on monitoring programs to prevent or minimize the risk of vessel strikes to sea turtles and other protected species and the reporting of any observations of injured or dead protected species.
- The scope, timing, and transitory nature of the proposed action and the wide-ranging movements of sea turtles in the Gulf will result in limited opportunity for vessel strikes on sea turtles.

3.3.3. Cumulative Impact Analysis

The relevant NEPA compliance documents address the cumulative impacts on sea turtles as a result of oil and gas leasing, exploration, development and production activities, including G&G activities. The information from these documents is incorporated by reference in this SEA.

Activities considered under the cumulative scenario which include the oil and gas program and other anthropogenic and natural activities, including the proposed action, may affect protected sea turtles or critical habitat. Sea turtles may be impacted by the degradation of water quality resulting from operational discharges, vessel traffic, noise generated by platforms, drilling rigs, helicopters and vessels, G&G surveys, explosive structure removals, oil spills, oil-spill-response activities, loss of debris from service vessels and OCS structures, commercial fishing, capture and removal, and pathogens. The cumulative impact of these ongoing OCS activities on sea turtles is expected to result in a number of chronic and sporadic sublethal effects (i.e., behavioral effects and nonfatal exposure to or intake of OCS-related contaminants or discarded debris) that may stress and/or weaken individuals of a local group or population and that may predispose them to infection from natural or anthropogenic sources. Through a systematic review, policy comparison, and stakeholder analysis, Nelms et al. (2016) found that potential impacts of seismic surveys on sea turtles vary (i.e., hearing damage, entanglement, and critical habitat exclusion)

and can be obscure due to the lack of research. Thus, understanding the impacts on individuals and populations can be challenging, and additional research is needed (Nelms et al., 2016).

Few deaths may occur from chance collisions with vessels, ingestion of plastic material, commercial fishing, and pathogens. Disturbance (noise from vessel traffic and survey equipment) and/or exposure to sublethal levels of toxins and anthropogenic contaminants may stress animals, weaken their immune systems, and make them more vulnerable to parasites and diseases that normally would not be fatal. The net result of any disturbance depends upon the size and percentage of the population likely to be affected, the ecological importance of the disturbed area, the environmental and biological parameters that influence an animal's sensitivity to disturbance and stress, or the accommodation time in response to prolonged disturbance (Geraci and St. Aubin, 1980).

Natural disturbances such as hurricanes can cause significant destruction of nests and topography of nesting beaches (Pritchard, 1980; Ross and Barwani, 1982; Witherington, 1986). Tropical storms and hurricanes are a normal occurrence in the Gulf and along the Gulf Coast. Some impacts of the hurricanes, such as loss of beach habitat, continue to impact sea turtles that would have otherwise used those areas as nesting beaches. Increases or decreases in beach armoring and other structures may impact all nesting sea turtles in the areas affected. Hurricanes and tropical activity may temporarily remove some of these barriers to suitable nesting habitat.

Incremental effects from the proposed action on sea turtles are expected to be **nominal** for vessel noise and marine trash and debris. Incremental effects from the proposed action on sea turtles are expected to be **nominal** to **minor** for active acoustic sound sources and vessel strike, though not rise to the level of significance because of the limited scope, duration, and geographic area of the proposed action, the wide-ranging movements of sea turtles in the Gulf, and adherence to the Project Criteria.

Conclusion

The effects of the proposed action, when viewed in light of the effects associated with other relevant activities, may affect sea turtles in the region. With the implementation of the required COAs for seismic survey and vessel operations, wide range of sea turtles in the Gulf, and the scope of the proposed action, incremental effects from the proposed seismic activities on sea turtles will be **nominal** for vessel noise and marine trash and debris and **nominal** to **minor** for active acoustic sound sources and vessel strikes.

3.4. Fish Resources and Essential Fish Habitat

3.4.1. Description

The life history, population dynamics, status, distribution, behavior, and habitat use of fish and essential fish habitat can be found in the relevant NEPA compliance documents and are incorporated by reference into this SEA.

Threatened or Endangered Species

Three fish species and one elasmobranch species found in the region are protected under the ESA: Gulf sturgeon, smalltooth sawfish, and giant manta ray and the ocean whitetip shark. The Gulf sturgeon (*Acipenser oxyrinchus*) was listed as threatened, effective October 30, 1991, under the ESA in the Federal Register (FR) at 56 FR 49653. The smalltooth sawfish DPS (*Pristis pectinata)* was listed as endangered, effective May 1, 2003, under the ESA at 68 FR 15674. The giant manta ray (*Manta birostris*) was listed as threatened, effective February 21, 2018, under the ESA at 83 FR 2916. The oceanic whitetip shark (*Carcharhinus longimanus*) was listed as threatened, effective March 1, 2018, under the ESA at 83 FR 4153. A detailed description of the Gulf sturgeon and critical habitat, smalltooth sawfish, giant manta ray, and oceanic white tip shark may be found in the 2025 NMFS BiOp.

Gulf sturgeon is predominantly distributed in the nearshore waters of the northeastern Gulf, from Lake Pontchartrain in Louisiana to the Suwannee River in Florida. Currently, the smalltooth sawfish is predominantly distributed in the nearshore waters of south Florida (FWS and Gulf

States Marine Fisheries Commission, 1995; NMFS, 2009). The essential fish habitat (EFH) for the oceanic whitetip shark in the project area includes localized areas in the central Gulf and Florida Keys. Although no EFH or critical habitat has been designated, the giant manta rays are widespread in the region. Giant manta rays occupy tropical, subtropical, and temperate oceanic waters and productive coastlines and are commonly found offshore in oceanic waters but are sometimes found feeding in shallow waters (less than 10 m) during the day (Miller and Klimovich, 2016).

Non-ESA-Listed Species

Approximately 1,540 species of fishes are recorded in the region and Florida Keys (McEachran, 2009). NOAA, working with the South Atlantic and Gulf of Mexico Fishery Management Councils, manage 71 and 40 fish and crustacean species, respectively, within the Federal waters of the Gulf. Distinctive fish assemblages are recognized within broad habitat classes including demersal (soft bottom and hard bottom), coastal pelagic, and oceanic pelagic (epipelagic and midwater) species. Fish are also classified by their movement patterns. Billfishes (marlins and sailfish), swordfish, tuna, and many shark species are considered highly migratory as they are widely distributed geographically and occur from coastal waters seaward into the open ocean. Highly migratory species move vertically in the water column to feed, usually on a daily basis, and move great geographic distances for feeding or reproduction (NMFS, 2006). An example is the Atlantic bluefin tuna, which are known to use the Gulf in the spring for spawning grounds (Teo et al., 2007a and 2007b; Teo and Block, 2010).

Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (MFCMA), as amended in 1996 by the Sustainable Fisheries Act, mandates that the regional Fishery Management Councils, through Fishery Management Plans, describe and identify EFH for each federally managed species, minimize adverse effects on such habitat caused by fishing, and identify other actions that encourage the conservation and enhancement of such habitats. Almost the entire Gulf is within a designated EFH. Further, the regional Fishery Management Council amended their plans (referred to as Generic Amendment Number 3, 2005) to more specifically designate that habitats less than 100 fathoms (600 ft) are identified and described as EFH.

Fish Hearing

All fish species have hearing and skin-based mechanosensory systems (inner ear and lateral line) used to detect sound in their environment (Fay and Popper, 2000; Popper, 2003). These sounds may be produced by other fish, other organisms (e.g., snapping shrimp, marine mammals), or other naturally occurring sounds such as waves breaking on the shore, rain on the water surface, etc. Many Gulf fish species are known to actively use sound to mediate specific behaviors (e.g., spawning). Anthropogenic (human-generated) sounds may affect fishes through auditory masking, behavioral modification, temporary hearing loss, or physiological injury. Masking of important environmental sounds or social signals could potentially reduce foraging success, increase predation, or disrupt reproduction. Studies suggest responses to anthropogenic sound can vary, even among members of a species. However, startle responses generally include avoidance behaviors away from adverse conditions. Responses may also vary with duration and frequency of exposure to a given signal. Fishes in close proximity to intense sound sources may experience temporarily reduced hearing sensitivity or TTS. These effects depend upon the type of sound, duration of sound, distance of sound, and fish species (Popper and Hastings, 2009). Injury to fishes as a result of rapid changes in pressure (barotrauma) may occur in close proximity to an intense sound source.

Hearing mechanisms in fishes have been studied extensively (Fay and Popper, 2000; Ladich and Popper, 2004; Webb et al., 2008), but the specific capabilities of species and the received-sound levels where potentially adverse impacts may occur are not well known. Furthermore, Popper and Fay (2011) suggest the broad designation of fishes as “hearing specialists” and “hearing generalists” is not sufficient to classify the hearing abilities of fishes. They recommend that the range of hearing capabilities across species is more like a continuum that includes the relative contributions of hydrostatic pressure to the overall hearing capabilities of a species. Although

studies have investigated physiological impacts (McCauley et al., 2000a; McCauley et al., 2003) and behavioral response (Skalski et al., 1992; Engås et al., 1996; Slotte et al., 2004; Løkkeborg et al., 2012; Fewtrell and McCauley, 2012) in several species, results are generally inconclusive and cannot be applied at the population level (National Science Foundation, 2011). However, information gaps are widely recognized (Hawkins et al., 2014; Popper et al., 2014) and broad guidance has been developed to minimize potential impacts to fishes and sea turtles resulting from anthropogenic sound exposure. The sections below provide a synopsis of the available information relevant to the effects on fish from exposure to seismic and other anthropogenic sound.

3.4.2. Impact Analysis

Distinctive fish assemblages can be found within a broad range of habitats in continental shelf and oceanic waters. The IPFs associated with the proposed action that could affect fish include (1) active acoustic sound sources, (2) vessel noise, and (3) vessel traffic. The GOM G&G PEIS contains a discussion of the potential impacts from survey operations on fish resources. Additional information about routine impacts from oil and gas activity on fish is addressed in the relevant NEPA compliance documents. The discussions are summarized below and are incorporated by reference into this SEA.

3.4.2.1. Alternative 1

If Alternative 1, the No Action Alternative, is selected the applicant would not undertake the proposed activities; therefore, the IPFs to fish would not occur. For example, there would be no seismic airgun noise that would result in behavioral change, masking, or non-auditory effects to the animals, no long-term or permanent displacement of the animals from preferred habitats, and no destruction or adverse modification of any habitats.

3.4.2.2. Alternative 2

If Alternative 2, the Proposed Action as Submitted, is selected the applicant would undertake the proposed activities as requested and conditioned in the application. As described in the analyses below, impacts to fish from the proposed action (e.g., hearing loss or behavioral disruption from seismic noise), are expected to be short-term, localized and not lead to significant impacts. Although the COAs outlined in **Chapter 2.4** and discussed in the marine mammal and sea turtle sections are requisite for permit approval, their implementation will not increase or decrease the potential for effects to fish from the proposed action.

3.4.2.3. Alternative 3

If Alternative 3, the Proposed Action with COAs, is selected the applicant would undertake the proposed activities as requested and conditioned in the application; however, the applicant would be required to undertake COAs identified by BOEM. As described in the analyses below, impacts to fish from the proposed action (e.g., hearing loss or behavioral disruption from seismic noise), are expected to be short-term, localized and not lead to significant impacts. Although the COAs outlined in **Chapter 2.4** would be included, their implementation would not increase or decrease the potential for effects to fish from the proposed action.

Potential Impacts to Fish from Active Acoustic Sound Sources

Fish ears respond to changes in pressure and particle motions (van Bergeijk, 1967; Schuijf, 1981; Kalmijn, 1988 and 1989; Schellert and Popper, 1992; Hawkins, 1993; Fay, 2005). Fish exposed to natural or manmade sound may experience physical and behavioral effects, ranging in magnitude from negligible to severe. The four areas of primary concern for fish exposed to elevated noise levels include: (1) hearing loss, (2) behavioral response, (3) masking, and (4) non-auditory effects.

Hearing Loss

To result in hearing loss, a sound must exceed the specific hearing threshold of that fish for a certain period of time (Popper, 2005). The consequences of temporary or permanent hearing loss in individual fish or a fish population is largely unknown. However, it likely depends upon the

number of individuals affected and whether critical behaviors involving sound (e.g., predator avoidance, prey capture, orientation and navigation, and reproduction) are adversely affected.

McCauley et al. (2003) found that caged pink snapper exposed to airgun sounds (600 pulses with peak-to-peak source levels of approximately 223 dB re 1 µPa-m) experienced observable anatomical damage to the auditory structures and that this damage did not repair 58 days after exposure. The damage as quantified by missing hair cells was relatively low, but the potential for impaired function in the remaining cells and the wider implications of potentially reduced fitness were not tested. Popper et al. (2005) documented TTS of northern pike and lake chub in the Mackenzie River Delta but found that broad whitefish receiving a source level of 177 dB re 1 $\mu Pa^2 \cdot s$ (decibels referenced to 1 microPascal squared, times seconds) showed no TTS. In both cases, the repetitive exposure to sound was greater than is expected in a typical seismic survey. Fishes involved in the study by Popper et al. (2005) were examined for damage to the sensory cells of the inner ear as a result of exposure to seismic sound, and no damage was observed (Song et al., 2008).

Behavioral Response

Behavioral effects from seismic noise on fishes can include changes in distribution, migration, mating, and ability to be caught. In general, any adverse effects on fish behavior or fisheries due to G&G surveys may depend on the species in question and the nature of the fishery (i.e., season, duration, and fishing method). Responses may also depend on the age of the fish, motivational state, size, and numerous unknown factors that are difficult, if not impossible, to quantify. Studies investigating the effects of sound (including seismic survey sound) on fish behavior were conducted on both uncaged and caged individuals (Chapman and Hawkins, 1969; Pearson et al., 1992; Santulli et al., 1999; Wardle et al., 2001; Hassel et al., 2003; Boeger et al., 2006) noted that fish typically exhibited a sharp “startle” response at the onset of a sound, followed by a return to normal behavior after the sound ceased. Investigation by Jorgenson and Gyselman (2009) indicated that behavioral characteristics of Arctic riverine fishes were generally unchanged by exposure to airgun sound.

Disturbance to fish population structures and distributions could result in reduced catch. An example would be temporary displacement of fish from traditional fishing grounds. Hirsh and Rodhouse (2000) reviewed studies investigating the hypothesis that seismic survey sounds have a deleterious effect on (usually commercial) fishing success. In most cases, these studies (e.g., Skalski et al., 1992; Engås et al., 1996) found that fishing catch of one or more target species declined with the onset of seismic survey operations and remained depressed throughout this activity and for days after. These effects, as reviewed in Boertmann et al. (2010), depend on species, fishing gear, and other environmental parameters. Further, reduced catch rates have been reported in some marine fisheries during seismic surveys; in several cases the findings are confounded by other sources of disturbance (Dalen and Raknes, 1985; Dalen and Knutsen, 1986; Løkkeborg, 1991; Skalski et al., 1992; Engås et al., 1996). No change was determined in catch-per-unit-effort of fish when airgun pulses were emitted, particularly in the immediate vicinity of the seismic survey (Pickett et al., 1994; La Bella et al., 1996; Wardle et al., 2001). For certain species, reductions in catch may have resulted from a change in behavior of the fish, such as a change in vertical or horizontal distribution (Slotte et al., 2004) and simply coincided with the seismic work.

Masking

Masking is defined as the effect of an acoustic source interfering with the reception and detection of an acoustic signal or other sound of biological importance to a receiver. Any sound within an animal’s hearing range can mask relevant sounds. Theoretically, the airguns or airgun arrays and vessel sound could contribute minimally to localized, short-term, and transitory masking of sound detection by some marine fishes, at least those species whose sound detection capacities are in the frequency range of the seismic survey sound source(s). However, there have been no documented studies concluding that seismic surveys resulted in the masking of any biologically relevant sounds for any fish species. This is most likely due to the roving nature of the G&G surveys or the limited exposure area where survey-related energy can be found. For example, some surveying technologies (e.g., vibroseis) may have operational frequencies or cycles that

present an increased potential for locally masking biologically relevant sounds. For a discussion of the biological relevance of ambient and signal sounds to fish, see Fay and Popper (2000).

Non-Auditory Effects

Existing research suggests there is a potential for non-auditory injury or mortality of fish in the immediate vicinity of a high-energy acoustic source. Airguns and airgun arrays may potentially injure or kill fishes within several meters at the time of discharge (Kostyvchenko, 1973; Dalen and Knutsen, 1986; Booman et al., 1996; Dalen et al., 1996). The potential for injury is greater among fishes with trapped gas pockets or swim bladders that expand and contract with the ambient pressure changes. There are few studies that specifically investigate the effects of airgun sound on fish larvae and eggs, but existing research suggests these life stages are no more vulnerable to intense sound than adult fishes. Other studies document no egg, larvae, or fish mortality resulting from exposure to seismic sources (Falk and Lawrence, 1973; Holliday et al., 1987; La Bella et al., 1996; Santulli et al., 1999; McCauley et al., 2000a and 2000b; Thomsen, 2002; Hassel et al., 2003; McCauley et al., 2003; Popper, 2005; Payne et al., 2009).

Physiological effects may also include cellular and/or biochemical responses by fish to acoustic stress. Such stress potentially affects fish by increasing mortality or reducing reproductive success. However, primary and secondary stress responses of fish after exposure to seismic survey sound appear temporary (Sverdrup et al., 1994; McCauley et al., 2000a and 2000b). The periods necessary for these biochemical changes to return to normal are variable and depend on numerous aspects of the biology of the species and of the sound stimulus. The effects to fish from acoustic sound sources are expected to be **nominal**.

Potential Impacts to Fish from Vessel Noise

Within the area of the proposed action, the Gulf sturgeon may be exposed to vessel noise when support vessels transit across their habitat. While the Gulf sturgeon may be able to detect passing vessels, they are not expected to be affected by the sound. Therefore, the effects to fish from vessel noise are expected to be **nominal**.

Potential Impacts to Fish from Vessel Traffic

In the last five-year NMFS species review, vessel strikes were identified as an emerging threat for Gulf sturgeon. The operator is required to adhere with the mitigation and monitoring measures provided in the Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Project Criteria. Compliance with the Project Criteria should reduce or avoid impacts from vessel strikes under this alternative. With these COAs in place, the impacts to the Gulf sturgeon and other fish species are expected to be **nominal.**

Conclusion

Noise from the proposed action could potentially result in acute injury and mortality of a minimal number of individuals of some species of fish, their larvae, and/or eggs when in very close proximity to a high-energy acoustic source. The proposed action may result in short-term, localized behavioral reactions. Highly migratory species like the bluefin tuna are found in the proposed action area at certain times of the year. However, given the small area and timeframe exposed to seismic noise under the proposed action, the transience of the moving seismic source relative to the region, and the small number of fish potentially within this localized area, the chance of non-auditory injury or mortality would be limited to an insignificant number of individuals. Seismic effects on such a small number of individuals would be insignificant at the population scale and considerably smaller than the natural mortality rate. Therefore, based on the limited best available science, seismic surveys are not expected to result in significant auditory or non-auditory injury or mortality on marine fish at the population scale. Finally, the frequency range of some G&G survey equipment (e.g., airguns) overlaps with the likely hearing range of the ESA-listed fish species; however, these species are not routinely found beyond state waters. Therefore, impacts to fish resources from the proposed activity would be **nominal**.

3.4.3. Cumulative Impact Analysis

Cumulative impacts on fish and EFH that result from oil and gas leasing, exploration, development, and production activity including G&G activities are discussed in the relevant NEPA compliance documents. The information from these documents is incorporated by reference in this SEA.

Activities considered under the cumulative scenario include the oil and gas program and other anthropogenic and natural activities, including the proposed action, may affect fish and fisheries. Degradation of water quality from multiple human activities as described in the relevant NEPA compliance documents will continually affect fish and fisheries species. The cumulative impact of these ongoing OCS activities on fish and fisheries is expected to result in a number of chronic and sporadic lethal and sublethal (behavioral effects and nonfatal exposure to or intake of OCS-related contaminants or discarded debris) effects that may stress and/or weaken individuals of a local group or population and predispose them to infection from natural or anthropogenic sources. Finally, non-anthropogenic sources such as red tides and tropical storms may add to the cumulative impacts on fish resources in the northern Gulf. The proposed action is a short-term event in a portion of the region; therefore, the effects from the proposed action will be slight in relation to these ongoing impacts.

The net result of any disturbance depends upon the size and percentage of the population likely to be affected, the ecological importance of the disturbed area, the environmental and biological parameters that influence an animal's sensitivity to disturbance and stress, and the accommodation time in response to prolonged stress.

Conclusion

The effects of the proposed action, when viewed in light of the effects associated with other relevant activities, may impact fish and fisheries in the Gulf. However, given the scope of the proposed action, incremental effects from the proposed seismic activities on fish and fisheries will be **nominal**.

3.5. BENTHIC COMMUNITIES

3.5.1. Description

For purposes of OCS activity impact analyses, BOEM defines "deepwater benthic communities," to include chemosynthetic and deepwater coral communities as those typically found in water depths of 984 ft (300 m) and greater (BOEM, 2017).

A description of chemosynthetic and deepwater coral communities in the region can be found in the relevant NEPA compliance documents. The following information is a summary of the descriptions in the EISs, and it is incorporated by reference into this SEA.

The continental slope in the Gulf extends from the edge of the continental shelf at a depth of about 656 ft (200 m); benthic communities have been found in water depths ranging from 656 ft to 11,483 ft (200 to 3,500 m) (BOEM, 2017). The vast majority of the region has a soft, muddy bottom in which burrowing infauna are the most abundant invertebrates. The proposed survey area generally falls into this category as the water depth of the proposed activity ranges from 1,640 to 6,562 ft (500 to 2,000 m).

A remarkable assemblage of invertebrates is found in association with hydrocarbon seeps in the Gulf. Chemosynthetic communities can occur at or near hydrocarbon seeps and are defined as persistent, largely sessile assemblages of marine organisms dependent upon symbiotic chemosynthetic bacteria as their primary food source (MacDonald, 1992). Invertebrate taxa in these communities include tube worms and bivalves, among others. Symbiotic chemosynthetic bacteria live within specialized cells in the invertebrate organisms and are supplied with oxygen and chemosynthetic compounds (methane and sulfides) by the host via specialized blood chemistry (Fisher, 1990). Chemosynthetic bacteria, which live on mats, in sediment, and in symbiosis with chemosynthetic invertebrates, use a carbon source independent of photosynthesis to make sugars and amino acids. The host, in turn, lives off the organic products subsequently

released by the chemosynthetic bacteria and may even feed on the bacteria themselves. Chemosynthetic communities can become established when a hard substrate is available for colonization at or near a seep. Depending on the situation, sessile benthic invertebrates can settle on and colonize carbonate substrate. These organisms form additional structure upon the seafloor, increasing the complexity of the habitat that may provide support to a variety of deepwater corals, invertebrates and fishes.

Some deepwater corals form communities occurring at or near hydrocarbon seeps, or on exposed outcrops, and may be found in association with chemosynthetic communities. Deepwater coral communities are also found on shipwrecks, and deepwater oil and gas infrastructure. These coral communities are distinctive and provide three-dimensional habitat for a range of fishes and invertebrates. Hard-bottom habitats in deep water include communities dominated by *Lophelia pertusa*, with other corals such as the bamboo coral (*Keratoisis flexibilis*) and zigzag coral (*Madrepora oculata*). Numerous other invertebrates are also associated with these benthic habitats (Sulak et al., 2008; Cordes et al., 2008; Fisher et al., 2007; Schroeder et al., 2005).

Hydrocarbon seep communities in the Gulf have been reported to occur at water depths greater than 300 m (984 ft) (BOEM, 2017). To date, there are over 300 deepwater benthic communities comprised of chemosynthetic organisms and/or deepwater corals. Once thought rare, research suggests that deepwater faunal communities are regularly associated with seafloor features commonly found in the vicinity of the primary geophysical signatures of the seabed for hydrocarbon migration to the seafloor. These areas include those where hydrocarbons percolate through sediments or where hydrocarbons move along faults that reach the seafloor. More than 23,000 positive anomalies have been identified from seismic survey data and each may represent a habitat where a hard substrate and a deepwater community may be found. However, until an anomaly has been visited and confirmed, it is unknown if hard substrates are exposed and capable of supporting deepwater benthic communities.

To map areas of probable habitat for deepwater benthic communities, scientists at BOEM analyzed decades of three-dimensional seismic data to classify seafloor returns exhibiting anomalously high or low reflectivity. The areas of high reflectivity represent patches of anomalous seafloor returns that likely indicate patches of hard seafloor that would provide substrate for deepwater benthic communities. Most confirmed hard bottoms in the deepwater Gulf were created by the precipitation of calcium carbonate substrate by chemosynthetic bacterial activity and are capable of supporting deepwater benthic communities. However, non-biogenic hard bottoms are also found at escarpments, seafloor-reaching faults, or where salt formations reach the surface. Investigations of the seafloor at patches of high reflectivity indicate that chemosynthetic and coral communities are much more common in the deepwater than previously known. Also, areas of low reflectivity (negative anomalies) can be indicative of gassy sediments and mud volcanoes with a high flux of hydrocarbons from the seafloor. Although uncommon, chemosynthetic bivalves may be found in areas with a high flux of hydrocarbons.

3.5.2. Impact Analysis

A detailed impact analysis of the routine, accidental, and cumulative impacts of the proposed activities on chemosynthetic communities and deepwater coral communities can be found in the relevant NEPA compliance documents and are incorporated by reference into this SEA.

Any hard substrate communities located in deep water would be particularly sensitive to impacts from OCS activities resulting in bottom disturbances and increased turbidity. Such impacts to these habitats could permanently prevent recolonization by similar organisms requiring hard substrate. The IPF associated with the proposed activities that could affect deepwater benthic communities include physical impacts from placement and recovery of OBNs and PIES.

3.5.2.1. Alternative 1

If Alternative 1, the No Action Alternative, is selected the applicant would not undertake the proposed activities. Therefore, the IPF to deepwater benthic communities would not occur. For example, there would be no bottom impacts that could result in physical damage to the deepwater benthic communities or their substrates.

3.5.2.2. Alternative 2

If Alternative 2, the Proposed Action as Submitted, is selected the applicant would undertake the proposed activities as requested and conditioned in the application. An example of potential impacts to deepwater benthic communities without implementation of the COAs and monitoring measures noted in **Chapter 2.4** and the following analysis includes, but is not limited to, physical damage to deepwater benthic communities or their substrates from the proposed survey activities. The operator proposes seismic survey activities with OBNs as receivers at sites that are located near potential and/or confirmed deepwater benthic communities which, without additional measures, may lead to potential impacts to those sites.

3.5.2.3. Alternative 3

If Alternative 3, the Proposed Action with COAs, is selected the applicant would undertake the proposed activities as requested and conditioned in the application; however, the applicant would be required to undertake COAs and monitoring measures as identified by BOEM. The measures outlined in **Chapter 2.4** are expected to decrease or negate the potential for impact to deepwater benthic communities from the proposed action. For the reasons set forth below, inclusion of these measures under Alternative 3 further limits or negates potential impacts to deepwater benthic communities.

Potential Impacts on Deepwater Benthic Communities from Bottom Disturbances

As described in **Chapter 2** of this SEA, the applicant proposes to conduct seismic survey activities that will involve the placement of OBNs and PIES, disturbing the seafloor in the area of the proposed action. If the OBNs or PIES are deployed near or atop a confirmed or potential deepwater benthic community, impacts to these sensitive habitats could permanently prevent recolonization by similar organisms.

If a high-density deepwater benthic community is subjected to impacts by bottom-disturbing activities, potentially severe or catastrophic impacts could occur due to direct impingement by a receiver or partial to complete burial due to resuspension of sediments. The severity of such an impact could be immediate loss of the community or incremental losses of productivity, reproduction, community relationships, leading to degradation of the overall ecological functions of the community and incremental damage to surrounding communities.

However, the offsets to OBN and PIES positioning proposed by BOEM will allow for deployment of the required OBNs and PIES within the demonstrated capability of the operator and provides for buffering of the seafloor disturbances caused by deployment. This COA ensures the potential for impacts resulting from the proposed survey activities are minimal. The effects to benthic communities from bottom disturbances are expected to be **nominal**.

Conclusion

Features capable of supporting deepwater benthic communities are located within the survey area. If the proposed bottom positioned receivers were to contact one of the sites, it would have the potential to destroy any sessile organisms that may be present or cause destruction of underlying carbonate structures on which organisms rely for substrate as well as dispersion of hydrocarbon sources. These impacts could be severe in the immediate area; with recovery times as long as 200 years for mature tube-worm communities and with some corals aged at over 2,000 years (Prouty et al., 2011), there is the possibility a community may never recover. The same geophysical conditions associated with the potential presence of chemosynthetic communities can also result in hard carbonate substrate upon which deepwater corals can attach. The proposed activities may impact the ecological function, biological productivity, or distribution of hard-bottom deepwater benthic (both chemosynthetic and deepwater coral) communities. Burial or disruption of the organisms from redistribution of bottom sediment or increased turbidity from resuspended sediment may foul or otherwise interfere with filter-feeding organs.

Recruitment of new organisms from nearby communities and settlement of organisms in areas with exposed hard ground may take years to decades to become established, if ever. With this in mind, BOEM uses COAs applied to permits to preserve such undisturbed areas. The COAs

outlined in **Chapter 2.4** would help assure sources for colonizing larvae and protect existing habitat. Impacts to hard-bottom communities are expected to be avoided as a consequence of compliance with existing BOEM regulations and adherence by the operator to the COAs.

Sensitive sessile benthic resources could occur in the vicinity of the proposed activities; with operator adherence to the measures in **Chapter 2.4**, the proposed activities are not expected to impact either known or probable areas of deepwater benthic communities.

3.5.3. Cumulative Impact Analysis

Considering the location of these habitats, the operator's proposed activities would constitute the primary effect on the resources that may exist in the area of the proposed action. As such, the potential cumulative impacts from all other activities would be identical to the effects described above. Given the negligible impacts on deepwater benthic communities, because of the application of BOEM avoidance criteria as described in NTL No. 2009-G40, the cumulative impacts are also **nominal.**

Conclusion

The effects of the proposed action, when viewed in light of the effects associated with other relevant activities, may impact deepwater benthic communities. However, given the scope of the proposed action and conservative nature of the applied conditions of approval, incremental effects from the proposed survey activities on deepwater benthic communities will be **nominal**.

The proposed activities are expected to have negligible impacts on the ecological function, abundance, productivity, and/or distribution of deepwater benthic communities given adherence to distancing requirements found in NTL No. 2009-G40. The operator's plan proposes compliance with the regulations as clarified by NTL No. 2009-G40. Bottom disturbances from nodal placement would be sited away from any sensitive deepwater benthic communities. Any sediments or fluids that could come in contact with the organisms would be diluted to a concentration where the impact to the deepwater benthic community would be **nominal**.

3.6. ARCHAEOLOGICAL RESOURCES

3.6.1. Description

Archaeological resources are defined in 30 CFR § 550.105 as, "…the material remains of human life or activities that are at least 50 years of age and that are of archaeological interest, including any historic property described by the National Historic Preservation Act, as defined in 36 CFR § 800.16(l)." Archaeological interest means that it is capable of providing scientific or humanistic understanding of past human behavior, cultural adaptation, and related topics through the application of scientific or scholarly techniques, such as controlled observation, contextual measurement, controlled collection, analysis, interpretation, and explanation.

As obligated under OCSLA regulations at 30 CFR § 551.6(a)(5), applicants are not allowed to disturb archaeological resources while conducting their survey activities. The description of archaeological resources (pre-contact and historic) can be found in the relevant NEPA compliance documents. The following information is a summary of these descriptions and is incorporated by reference into this SEA.

Pre-contact

Pre-contact Native American sites may exist on the OCS dating from the time at the end of the last Ice Age (~20,000 to 22,000 years ago), when sea levels were about 427 ft (130 m) lower than they are today. Based on our current understanding of the archaeological and geological evidence, BOEM has adjusted, over time, its understanding of when and where people may have lived on the OCS when it was a terrestrial landform. Based on this evidence, consultations with Native American Tribes, advances in remote sensing technology, and new coring methodologies to locate submerged ancient landforms, BOEM has updated the depth within the Gulf where remote sensing surveys for ancient landforms are required (from the previous depth of 60 to 130 m [200 to 427 ft]).

Historic

Submerged historic archaeological resources in the OCS and along the Gulf Coast consist mostly of historic shipwrecks and historic aircraft. A historic shipwreck is defined as a submerged or buried vessel or its associated components, at least 50 years old, that has foundered, stranded, or wrecked, and that is currently lying on or embedded in the seafloor. A proprietary database of shipwrecks maintained by BOEM currently lists over 1,300 named shipwrecks in the Gulf. Many of these reported shipwrecks may qualify for listing on the National Register of Historic Places. Although a number of shipwrecks have been identified based on historical documents, there are many others that have yet to be located and many more still for which no record of their loss survives and whose identity and location remains unknown. Currently a high-resolution remote sensing survey is the most reliable method for identifying and avoiding historic archaeological resources.

At present, high-resolution geophysical, ROV, and/or diver survey is required for all new bottom disturbing activities by the oil and gas industry. Historic shipwrecks have, with the exception of three significant vessels found by treasure salvers, been primarily discovered through oil industry sonar surveys in water depths up to 11,000 ft (3,353 m). The preservation of historic wrecks found in deep water has been outstanding because of a combination of environmental conditions and limited human access.

3.6.2. Impact Analysis

The IPF associated with the proposed action that could affect archaeological resources is seafloor disturbance from the placement and recovery of OBNs and PIES. Available literature is not sufficient to identify historic shipwreck losses in the area of the proposed action as historic records of losses occurring this far offshore are not location-specific (Pearson et al., 2003; Krivor et al., 2011; Rawls and Bowker-Lee, 2011). However, if a historic resource exists in the survey area, direct physical contact with a shipwreck site could destroy fragile materials, such as hull remains or artifacts, and could disturb the site context (Atauz et al., 2006; Church and Warren, 2008).

The IPF that could be associated with accidental events include seafloor disturbances from jettisoned/lost debris. Similar to routine impacts, discarded/lost material that falls to the seabed has the potential to damage and/or disturb archaeological resources.

The GOM G&G PEIS contains a discussion of the potential impacts from survey operations on archaeological resources (BOEM, 2017). Additional information about routine impacts from oil and gas activity on archaeological resources is addressed in the relevant NEPA compliance documents. The following information is a summary of the impact analyses and is incorporated by reference into this SEA.

3.6.2.1. Alternative 1

If Alternative 1, the No Action Alternative, is selected the applicant would not undertake the proposed activities; therefore, the impacts to archaeological resources would not occur. For example, there would be no bottom impacts from OBN or PIES placement that could result in potential loss of any known or unknown historic archaelogical resource.

3.6.2.2. Alternative 2

If Alternative 2, the Proposed Action as Submitted, is selected the applicant would undertake the proposed activities as requested and conditioned in the application. An example of potential impacts to archaeological resources would include, but is not limited to, damage to potential archaeological resources from the proposed survey activities. The operator proposes seismic survey activities with OBNs as receivers and PIES at sites that are located near potential and/or confirmed archaeological resources which, without additional COAs and monitoring measures, may lead to potential impacts to those sites.

3.6.2.3. Alternative 3

If Alternative 3, the Proposed Action with COAs, is selected the applicant would undertake the proposed activities as requested and conditioned in the application; however, the applicant would be required to undertake COAs and monitoring measures as identified by BOEM. The COAs and monitoring measures outlined in **Chapter 2.4** are expected to decrease or negate the potential for impact to archaeological resources from the proposed action. For the reasons set forth below, inclusion of these measures under Alternative 3 further limits or negates potential impacts to archaeological resources.

Routine Activities

Historic modeling assumes that shipwrecks would be found closest to shore along the Federal/State boundary or within 10 mi (16 km) of their reported loss location. However, high-resolution geophysical data acquired by oil and gas industry remote sensing surveys now indicate that this model is too limited. For example, several vessel casualties from World War II with historically reported coordinates were later discovered well over 10 mi (16 km) outside the 9-square mile area assumed to be their location by the model (Irion, 2002). An early nineteenth century steamship lost off the Texas coast was found by treasure salvers over 120 mi (193 km) from the area of its presumed loss in the Minerals Management Service model (Irion, Official Communication, 2011). These situations, coupled with the fact that no confirmed historic shipwreck sites had been found in any of the designated historic high probability area in 20 years, led to a study released in 2003 (Pearson et al., 2003) to reassess the high-probability model. Some of the recommendations of this study were implemented in September 2024 with the revision of 30 CFR § 550.194 and 195. The current requirement is that all new bottom disturbing activity by the oil and gas industry be cleared by high-resolution geophysical, ROV, and/or diver survey.

Impacts to a historic site could result from direct physical contact with an OBN or PIES causing irreversible damage. The undisturbed provenience of archaeological data (i.e., the 3-dimensional location of archaeological artifacts) allows archaeologists to accumulate a record of where every item is found, and to develop a snapshot as to how artifacts relate to other items or the site as a whole. The analysis of artifacts and their provenience is one critical element used to make a determination of eligibility to the National Register of Historic Places under 30 CFR § 60.4 and is essential in understanding past human behavior and ways of life. Impacts from the proposed operations could alter the provenience and destroy fragile remains, such as the hull, wood, glass, ceramic artifacts and possibly even human remains, or information related to the operation or purpose of the vessel. The destruction and loss of this data eliminates the ability of the archaeologist to fully and accurately detail activity areas found at the site, variation and technological advances lost to history, the age, function, and cultural affiliation of the vessel, and its overall contribution to understanding and documenting the maritime heritage and culture of the region. Under Alternative 3, the operator is required to avoid known archaeological resources and cease operations should the operator discover an unknown, potential archaeological resource. With the conditions of approval and monitoring measures in place under Alternative 3, the effects to archaeological resources are expected to be **nominal**.

Accidental Events

An IPF that could result from an accidental event is from the loss of debris from the survey and support vessels during survey operations. Debris such as structural components (i.e., grating, wire, tubing, etc.), boxes, pallets, and other loose items can become dislodged during heavy seas or storm events and fall to the seabed. Similar to the impacts noted under Routine Activities, if debris were to fall onto an unknown archaeological resource, damage could destroy fragile materials, such as hull remains and artifacts, and could disturb the site's context and associated artifact assemblage. Additionally, lost material could result in the masking of actual archaeological resources or the introduction of false targets that could be mistaken in the remote sensing record as historic resources.

3.6.3. Cumulative Impact Analysis

Cumulative impacts on unknown archaeological resources that may be present in the area of the proposed action could result from other OCS activities such as commercial fishing, marine transportation, and adjacent oil and gas exploration, development, and production operations.

During adjacent oil and gas operations, commercial fishing, and maritime transportation activities, there is associated loss or discard of debris that could result in the masking of archaeological resources or the introduction of false targets that could be mistaken in the remote sensing record as historic resources. Future exploration, development, and production operations and/or any related infrastructure support could lead to bottom disturbances in the area of the proposed action; however, no additional activities have been proposed or are under review at this time.

Any known or unknown archaeological resources that may be present in the proposed survey area could be impacted by contact with oil from a blowout or spill from adjacent oil and gas operations. Similarly, cumulative impacts from accidental oil spills and remediation efforts for adjacent oil and gas operations are not expected because of the water depth at the proposed site and the historically low probability of a loss of well control/blowout.

Considering the potential cumulative impacts from all other activities, the operator's proposed activities would constitute the primary effect, if any, on any known or unknown archaeological resource that may exist in the area of the proposed action.

Conclusion

Based on the previous information, study conclusions, and the number of confirmed wrecks recently found in similar water depths, there is reason to believe that archaeological resources could be present in the area of the proposed action. Impacts may include damage and/or disturbance to the potential resources from OBN and PIES placement. Impacts from accidental events related to the proposed action such as debris lost from the survey and support vessels could lead to impacts similar to those expected from routine impacts. If the operator's seabed disturbing activities make contact with these targets, it might have a significant impact on the resources. The site-specific review of the proposed activity indicates that there are potential archaeological targets within the vicinity of the proposed OBN and PIES deployments. Based on the review findings, it is likely that submerged archaeological resources could exist in the area of the proposed action as targets have been identified in pre-existing survey data. Without necessary avoidance COAs and monitoring measures, selecting Alternative 3 should not result in significant impacts to archaeological resources; the effects are expected to be **nominal**.

3.7. OTHER USERS OF THE OCS

BOEM is required to consider the impact of the proposed action on other users of the OCS; one of the most prevalent users is the U.S. military. All military activities on the OCS occur within MWAs or Eglin Water Test Areas (EWTAs) designated by the Federal Aviation Administration in coordination with the U.S. Department of Defense. Space-use conflicts related to military activities were addressed in the GOM G&G PEIS; potential impacts related to MWAs were determined to be **nominal**. Lessees and permittees conducting G&G operations within these warning areas are required to coordinate with the appropriate military command.

The survey operations and routes to be taken by vessels in support of TGS' proposed survey will operate within MWAs W-147AB, W-147D, W-147E and W-602 shown at: http://www.boem.gov/Environmental-Stewardship/Environmental-Studies/Gulf-of-Mexico-Region/MWA_boundaries-pdf.aspx. TGS shall contact the appropriate individual military command headquarters concerning the control of electromagnetic emissions and use of boats in each of the areas before commencing your operations. A list of contacts can be found at: http://www.boem.gov/Environmental-Stewardship/Environmental-Studies/Gulf-of-Mexico-Region/Military-Contacts-pdf.aspx.

Using this information, the coordination COA has proven effective over many years to reduce the risk of interrupting planned military or geophysical activities.

3.8. OTHER CONSIDERATIONS

A discussion of the other resources considered but not analyzed under this SEA is found in the relevant NEPA compliance documents.

4. CONSULTATION AND COORDINATION

On March 31, 2026, the Endangered Species Committee convened in Washington, D.C. to consider the Secretary of Defense's determination that an exemption from the ESA was necessary for national security purposes in relation to Gulf oil- and gas-activities. The Committee voted to grant the exemption pursuant to Section 7(j) of the ESA. In accordance with 16 U.S.C. § 1536(j), post-lease oil- and gas-activities are therefore exempt from the ESA's consultation requirements and take prohibitions under the Committee's March 31, 2026 order. The order further directs BOEM and BSEE to implement all existing mitigation and monitoring measures, identified as project criteria, through their OCSLA approval processes, and these measures will continue to be imposed as COAs.

BOEM petitioned NMFS for rulemaking under the MMPA (16 U.S.C. §§ 1361 et seq.) relating to G&G surveys on the OCS in the Gulf. On January 19, 2021, NMFS published in the Federal Register a final ITR, which became effective on April 19, 2021 (NMFS, 2021). A draft revision to this regulation that corrects some calculation errors and therefore adjusts taking allowable under the regulations was published on January 5, 2023 (NMFS, 2023a). On April 24, 2024, NMFS published in the Federal Register its final rule, "Taking and Importing Marine Mammals: Taking Marine Mammals Incidental to Geophysical Surveys in the Gulf of Mexico" (NMFS, 2024a). The rule is effective from May 24, 2024, through April 19, 2026. There are no changes to the specified activities or the specified geographical region in which those activities would be conducted, nor to the original 5-year period of effectiveness. A new request for MMPA authorization was prepared and submitted by industry in March 2025. On September 3, 2025, NOAA Fisheries announced the receipt of a request from the NOAA Fisheries Office of Policy for the reimplementation of ITRs governing the incidental taking of marine mammals during geophysical surveys conducted in the Gulf and invited the public to provide information, suggestions, and comments on the request (NMFS, 2025c).

NMFS published the final rule implementing EFH provisions of the Magnuson-Stevens Fisheries Conservation and Management Act on January 17, 2002 (NMFS 2002); certain OCS oil- and gas-related activities authorized by BOEM may result in adverse effects to EFH and therefore require EFH consultation. BOEM prepared an EFH Assessment that described the proposed OCS activities, analyzed the effects on EFH, and identified mitigating measures (BOEM, 2022). The EFH Assessment was sent to NMFS on May 25, 2022, with a letter requesting formal consultation. NMFS responded to BOEM's request with conservation recommendations on July 29, 2022. The regional programmatic EFH consultation concluded on September 27, 2022, when BOEM and BSEE responded via letter to NMFS' conservation recommendations. The programmatic EFH consultation covers reasonably foreseeable oil- and gas- related activities on the OCS. The conservation recommendations contain provisions for initiating supplemental discussions for site-specific or activity-specific consultations, if warranted (BOEM, 2025).

In accordance with the National Historic Preservation Act (54 U.S.C. §§ 300101 et seq.), Federal agencies are required to consider the effects of their undertakings on historic properties. The implementing regulations for Section 106 of the National Historic Preservation Act, issued by the Advisory Council on Historic Preservation (36 CFR § 800), specify the required review process. In accordance with 36 CFR § 800.8(c), BOEM intends to use the NEPA substitution process and documentation for preparing an Environmental Impact Statement/Record of Decision or an Environmental Assessment/Finding of No Significant Impact to comply with Section 106 of the National Historic Preservation Act in lieu of 36 CFR § 800.3-800.6.

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APPENDIX

PROJECT CRITERIA

A. GEOPHYSICAL SURVEY PROJECT CRITERIA[1]

A.1. BACKGROUND

The use of marine acoustic sources for acquiring geophysical data (geophysical surveys) may have an impact on marine life, including marine mammals (all of which are protected under the Marine Mammal Protection Act [MMPA]) and species listed under the ESA. In addition, the Outer Continental Shelf Lands Act (OCSLA) requires that geophysical survey data be obtained in an environmentally sound manner. Due to these legal and environmental concerns, protocols were developed to mitigate the impacts of these sources on sensitive species and habitats and have become part of the project criteria for BOEM's approvals. The BOEM/BSEE proposed action under the 2025 NMFS BiOp includes robust avoidance or minimization measures (i.e., protocols), and those measures will continue to be implemented in the Gulf of America as project criteria under the 2026 Endangered Species Committee Order, as well as pursuant to the Bureaus authority under OCSLA (43 U.S.C. §§ 1331 et seq.).

These protocols were included as part of the proposed action in the 2025 NMFS BiOp[2], reflect past and current requirements, and are based on measures identified through the following:

- review of mitigation protocols required or recommended elsewhere and implemented pursuant to BOEM and BSEE's authority under OCSLA
- review of articles and other available scientific literature; project design criteria, terms and conditions, and reasonable and prudent measures identified in ESA section 7 consultations
- mitigation, monitoring, and reporting requirements identified in previous MMPA Incidental Take Authorizations (ITAs) issued to survey operators
- NMFS' technical memorandum on standards for a protected species observer and data management program (Baker et al., 2013).

To protect marine mammals and ESA-listed species (hereafter referred to as protected species) during operations, operators are required to follow specific survey protocols. Here, we address standardized baseline operational mitigation and monitoring protocols. However, it is important to be clear that different and/or additional protocols may sometimes be required depending on the specific action, location, and/or circumstances[3]. For example, time/area restrictions (which are not discussed here) may be required where sensitive species or stocks and/or critical biological functions are known to occur, or where subsistence uses are occurring.

Compliance with these standard operational requirements must be demonstrated by submitting

[1] Agencies responsible for the preparation of these protocols include NOAA's NMFS, BOEM, and BSEE. The DOI's U.S. Geological Survey and the National Science Foundation provided input. Requirements for notifications, reporting, etc. to BOEM and/or BSEE are limited to activities occurring pursuant to those agencies' relevant statutory and regulatory authorities.

[2] These protocols are designed for use in conjunction with activities for which take is authorized and/or exempted under the MMPA and/or ESA (Tiers 1/2) or may be used to avoid the potential for take or otherwise reduce impacts to species (Tier 3). "Take" is defined under the respective statutes.

[3] We note that for any MMPA authorization issued, measures ensuring the "least practicable adverse impact" must be included, and that this standard applies to both marine mammal species or stocks and their habitat, as well as subsistence uses. This means that while a standardized list of measures will be helpful by increasing efficiency and effectiveness, NMFS still must independently evaluate every application, and there may occasionally be circumstances wherein the appropriate application of the "least practicable adverse impact" standard necessitates either the inclusion of additional measures or the shutdown of otherwise standard measures. Likewise, each ESA section 7 consultation requires analysis of the specific action proposed by the action agency. Protocols considered part of the proposed action are referred to as conservation measures in ESA consultations and the extent to which they avoid or minimize the effects of the action on ESA-listed species and/or designated critical habitat is analyzed as part of the consultation. Formal ESA section 7 consultations require NMFS issue a Biological Opinion with an associated Incidental Take Statement (ITS) that includes Reasonable and Prudent Measures (RPMs) considered necessary or

reports as detailed below in the Reporting section.

Geophysical surveys are conducted to acquire information on marine seabed and subsurface geology, seafloor bathymetry, and water column features. The purposes of geophysical surveys include, but are not limited to: (1) obtaining data for hydrocarbon and mineral exploration and production; (2) siting of oil and gas structures, facilities, and pipelines and renewable energy structures and cables; (3) identifying possible seafloor or shallow-depth geologic hazards; (4) locating archaeological resources and benthic habitats; (5) mapping seafloor bathymetry and structure; and (5) conducting academic or government research.

A general hierarchy of protocols is presented for three different categories of activities: Tier 1, Tier 2, and Tier 3. De minimis sources are included in a Tier 4, with no required mitigation protocols. A summary of the Tiers is shown in Table A-1.

Table A-1. Summary of Tiers and Associated Project Criteria

Elements	Tier 1	Tier 2	Tier 3[4]	Tier 4
Sources	Airgun arrays > 1,500 in^3 or any array with > 12 airguns	Airgun arrays ≤ 1,500 in^3 or ≤ 12 airguns	Sparkers	*De minimis* sources (see below)
Visual Protected Species Observers (PSO)[5]	Minimum of 2 NMFS- approved PSOs on duty during daylight hours (30 minutes before sunrise through 30 minutes after sunset); Limit of 4 consecutive hours on watch followed by a break of at least 1 hour; Maximum of 12 hours on watch per 24-hour period	Minimum of 2 NMFS-approved PSOs on duty during daylight hours (30 minutes before sunrise through 30 minutes after sunset); Limit of 4 consecutive hours on watch followed by a break of at least 1 hour; Maximum of 12 hours on watch per 24-hour period	Minimum of 1 PSO on duty during daylight hours (30 minutes before sunrise through 30 minutes after sunset); PSOs must be either designated by the Federal agency funding/ conducting the survey or approved by NMFS	Not required
Passive acoustic monitoring (PAM)	Required[6]; minimum of 1 NMFS-approved PAM operator on duty from 30 minutes before start of source to 1 hour past the end of source use; Limit of 4 consecutive hours on watch followed by a break of at least 1 hour; Maximum of 12 hours on watch per 24-hour period	Not required		
Shutdown zones	• 500 m (all marine mam • 1,500 m (special circumstances; see Table A-2) • 150 m (sea turtles)	• 100 m (all marine mammals and sea turtles) • 500 m (special circumstances; see Table 2 below)		Not required
Pre-start clearance (additional buffer zone as applicable)	Required; 30-minute clearance period of the following zones: • 1,000 m (all marine mammals) • 1,500 m (special circumstances; see Table 2	Required; 30-minute clearance period of the following zones: • 200 m (all marine mammals) • 100 m (sea turtles)	Required; 30-minute clearance period of the following zones: • 100 m (all marine mammals and sea turtles) • 500 m (special	Not required

appropriate to minimize the impact of any incidental take of ESA-listed species. Terms and Conditions (T&C) to implement the RPMs are included in the ITS. The RPMs and associated T&Cs may require additional measures to minimize take of ESA- listed species. There may also be cases where NMFS determines the measures described in this document and included in conservation measures that are part of the proposed action require modification or are not sufficiently protective as to avoid or minimize the effects of the action on ESA-listed species and/or designated critical habitat. Consistent with the 2026 order issued by the Endangered Species Committee, BOEM and BSEE are implementing the proposed action from the ESA consultations for oil and gas activities in the GOM, as well as mitigations required by the Bureaus through authorities under other laws such as OCSLA.

[4] A MMPA Incidental Take Authorization is not required for Tier 3 surveys implementing these protocols.

[5] 24-hour visual monitoring may be required as warranted by improvements in low-light detection capabilities.

[6] PAM is not required for Tier 1 surveys occurring in Cook Inlet or in water depths <100 m in the GOM. Borehole seismic surveys (also referred to as vertical seismic profiles (VSP)) involving use of a stationary source position that is close to the well (e.g., deployed from a platform) such as zero-offset VSPs are not required to use PAM.

Elements	Tier 1	Tier 2	Tier 3*	Tier 4
	below) • 150 m (sea turtles) Following detection within zone, animal must be observed exiting or additional period of 15 or • 30 minutes	• 500 m (special circumstances; see Table 2 below) Following detection within zone, animal must be observed exiting or additional period of 15 or 30 • minutes	circumstances; see Table 2 below) Following detection within zone, animal must be observed exiting or additional period of 15 or 30 minutes	
Ramp-up	Required; duration ≥ 20 minutes	Required for arrays only; duration dependent on number of elements; no minimum duration required	Required when technically feasible; ramp up sources to half power for 5 minutes and then to full power	Not required
Shutdown	Shutdown required for marine mammal detected within defined shutdown zones; Shutdown (i.e., pause) not requiring ramp -up for sea turtles detected within defined shutdown zones (during Tier 3 surveys, shutdown [i.e., pause] for sea turtles is optional); Exception for certain delphinids and pinnipeds; Re-start allowed following clearance period of 15 or 30 minutes.			Not required

in^3 = cubic inches

A.2. TIER SUMMARY

Tier 1: Airgun arrays with total volume greater than 1,500 cubic inches (in^3) or any array with more than 12 airguns.

Tier 2: Airgun arrays with total volume less than or equal to 1,500 in^3 and 12 airguns or fewer, or a single airgun.

Tier 3: Sparkers.

Tier 4: *De minimis* sources. Examples of *de minimis* sources include:

- Multibeam echosounders (hull-mounted or portable)
- Side-scan and sector-scanning sonars
- Hull-mounted non-parametric sub-bottom profilers (SBPs) (e.g., Knudsens)
- Parametric shallow penetration SBPs (e.g., Innomars)
- Fathometers for navigation
- Towed non-parametric SBPs/ Compressed High-intensity Radiated Pulse (Chirp) systems (e.g., Edgetech 424, Edgetech 512i)
- EK60/EK80 split-beam echosounders
- 3-plate boomers
- Pingers (acoustic locators) for locating over the side wireline instrumentation in the water column
- Acoustic releases (brief duration pinging), e.g., for moorings, landers, OBS
- Ultra-short baseline (USBL) and long baseline (LBL) positioning equipment, e.g., for navigation of submersibles, remotely operated vehicles (ROVs), etc.
- All Acoustic Doppler Current Profiling (ADCP) equipment
- All instrumentation on human occupied vehicle (HOV)/ autonomous underwater vehicle (AUV)/ROVs
- Pressure-equipped inverted echo sounders (PIES) and Pressure Monitoring Transducers (PMTs)
- Electromagnetic sources

- Wolfspar[7]
- All instruments operated at 180 kHz or greater

Any additional sources that have the similar source level/directivity/frequency characteristics as those already included here may be included in Tier 4.

A.3. DEFINITIONS

Terms used in these protocols have the following meanings:

1. Protected species means any NMFS trust species listed under the ESA and/or protected by the MMPA. The requirements discussed herein primarily focus on air-breathing protected species that are more readily observed at the surface, such as marine mammals and sea turtles. However, other ESA-listed species are also protected, and observations of these species should be reported as detailed below.
2. Protected Species Observer (PSO) means a trained, independent biologist employed for purposes of conducting visual and/or acoustic observation for protected species. A conditionally-approved PSO is one with limited geophysical survey experience (i.e., less than 90 days tier-specific at-sea duty time under a lead PSO). An unconditionally-approved PSO is one with more than 90 days tier-specific at-sea experience (but no more than 18 months elapsed since the conclusion of the at-sea experience).
3. An Incidental Take Authorization (ITA), issued pursuant to the MMPA, authorizes the take of marine mammals incidental to a specified activity. An ITA may be either an incidental harassment authorization (IHA), which is effective for a maximum period of one year, or a letter of authorization (LOA), which is issued under incidental take regulations (ITR) and may be effective for a period of up to five years.
4. An Incidental Take Statement (ITS) is provided with a biological opinion, in cases where NMFS concludes that a proposed agency action is found to be consistent with section 7(a)(2) and the proposed action may incidentally take ESA-listed species. The ITS specifies the impact of any incidental taking of listed species. To minimize such impacts, Reasonable and Prudent Measures (RPMs) and Terms and Conditions to implement the RPMs must be provided. Section 7(b)(4)(C) of the ESA provides that take of ESA-listed marine mammals may be included in the ITS of a biological opinion only if the taking is authorized through an MMPA ITA. Consistent with the 2026 Endangered Species Committee order, BOEM and BSEE are exempted from the take prohibitions and limitations under the ESA in the Gulf of America, but must still comply with mitigations, protocols and reporting pursuant to the order and the Bureaus' requirements issued under their authority under OCSLA.
5. Tier 1 surveys are those using an airgun array with a total volume of greater than 1,500 in^3, or those containing more than 12 airguns, as the acoustic source. These surveys are also referred to as deep penetration or high energy surveys.
6. Tier 2 surveys are those using an airgun array with total volume of 1,500 in^3 or less, with 12 or fewer airguns, or a single airgun as the acoustic source. These surveys are also referred to as shallow penetration or low energy surveys.
7. Tier 3 surveys are those using a sparker.
8. "De minimis" here refers to sources considered unlikely to result in the incidental take of protected species. No mitigation protocols are required during surveys using only *de minimis*, or Tier 4, sources. Generally, use of these sources may be considered as not likely to adversely affect ESA-listed species and would not result in incidental take of marine mammals (as defined under the MMPA).
9. The term "small odontocetes" is used herein to define a group of cetacean species for

[7] Wolfspar is a proprietary low-frequency source used to supplement the quantity and quality of data collected during surveys using conventional airgun sources. Wolfspar is a variable-frequency marine resonator designed to produce ultra-low frequency swept (non-impulsive) signals (from 1.4 – 16 hertz (Hz) but typically used to produce signals at 2 – 4 Hz). Other alternative low-frequency source may be evaluated on a case-by-case basis.

purposes of defining the appropriate pre-start clearance period. Small odontocetes, as defined here, include certain genera of the Family Delphinidae (*Delphinus*, *Lagenodelphis*, *Lagenorhynchus*, *Lissodelphis*, *Stenella*, *Steno*, and *Tursiops*) and members of the Family Phocoenidae (i.e., porpoises). Note that the use of the term "small" in this context is not an absolute reference to size, but is rather used as reference to a group of species that are not typically deep diving.

10. The term "small delphinid" is used herein to define a group of cetacean species for which shutdown requirements are waived. Small delphinids, as defined here, include the same genera of the Family Delphinidae as are included in the definition of the term "small odontocete" above.
11. Pre-start clearance refers to a period of monitoring that may be required in order to ensure that protected species are not present within defined zones prior to activation of the sound source.
12. Ramp-up means the gradual and systematic increase of emitted sound levels from an active acoustic source.
13. Shutdown of the acoustic source means the immediate de-activation of the source, including all individual airgun elements of an array.
14. Shutdown zone (formerly exclusion zone) means the area to be monitored for possible shutdown upon detection of protected species within or entering that zone.
15. Buffer zone means a focal area beyond the standard shutdown zone to be monitored for the presence of protected species.
16. Visual monitoring means the use of trained PSOs (visual PSOs) to systematically scan the ocean surface visually for the presence of protected species and implement the required mitigation procedures. These PSOs must have successfully completed a PSO training program as described below. The focal area for visual observation includes the shutdown zone and buffer zone (when required), but PSOs should periodically scan adjacent waters. Visual monitoring of the shutdown zones and adjacent waters is intended to establish and, when visual conditions allow, maintain zones around the sound source that are clear of protected species. Visual monitoring of the buffer zone (when required) is intended to (1) provide additional protection to protected species that may be in the area during pre-start clearance, (2) aid in establishing and maintaining the shutdown zone by alerting the PSOs and crew of protected species that are outside of, but may approach and enter, the shutdown zone, and (3) enable collection of additional monitoring data to support an understanding of the effects of the activity on protected species.
17. Acoustic monitoring means the use of trained PSOs (acoustic PSOs[8]) to operate PAM equipment to acoustically detect the presence of vocalizing marine mammals. These observers must have successfully completed an acoustic PSO (or PAM operator) training program as described below. Acoustic monitoring involves acoustically detecting vocalizing marine mammals regardless of distance from the source, as localization of animals may not always be possible. Acoustic monitoring is intended to further support visual monitoring in maintaining a shutdown zone around the sound source. In cases where visual monitoring is not effective (e.g., due to weather, nighttime), acoustic monitoring may be used to allow certain activities to occur (or continue), as further detailed below.

A.4. General Requirements (Tiers 1 – 3)

1. A copy of any issued BOEM permit (if applicable) and/or ITA (if required) must be in the possession of the holder, vessel operator, other relevant personnel, the lead PSO (see description below), and any other relevant designees operating under the authority of the permit and/or ITA.

[8] Acoustic PSOs may be referred to as PAM operators.

2. The operator must instruct relevant vessel personnel with regard to the authority of the protected species monitoring team, and must ensure that relevant vessel personnel and the protected species monitoring team participate in a joint onboard briefing (hereafter PSO briefing), led by the vessel operator and lead PSO, prior to beginning work to ensure that responsibilities, communication procedures, protected species monitoring protocols, safety and operational procedures, and permit/ITA requirements are clearly understood. This PSO briefing must be repeated when relevant new personnel (e.g., PSOs, acoustic source operator) join the survey operations before work commences.
3. The acoustic source must be deactivated when not acquiring data or preparing to acquire data, except as necessary for testing. Unnecessary use of the acoustic source must be avoided. For use of airgun arrays, notified operational capacity (not including redundant backup airguns) must not be exceeded during the survey, except where unavoidable for source testing and calibration purposes. All occasions where activated volume exceeds notified operational capacity must be communicated to the PSO(s) on duty and fully documented. The lead PSO must be granted access to relevant instrumentation documenting acoustic source power and/or operational volume.

A.5. Protected Species Observers

NMFS-approved PSOs must be used during Tier 1-3 surveys; Tier 3 surveys funded/conducted by Federal agencies are exempted from the requirements specified here but must designate qualified shipboard personnel to fulfill this role. Minimum PSO qualifications and required equipment for Tier 1-3 survey types (aside from the aforementioned Tier 3 surveys funded/conducted by Federal agencies) are identified here. The approval process includes NMFS' review of PSO qualifications using standardized guidance for PSO requirements. The number and types of PSOs required are included in the survey-specific sections below.

A.5.1. Qualifications

1. The operator must use independent, dedicated, trained PSOs, meaning that the PSOs must be employed by a third-party observer provider, must have no tasks other than to conduct observational effort (visual or acoustic[9]), collect data, and communicate with and instruct relevant vessel crew with regard to the presence of protected species and mitigation requirements (including brief alerts regarding maritime hazards), and must have successfully completed an approved PSO training course for geophysical surveys appropriate for their designated task (visual or acoustic). Acoustic PSOs are required to complete specialized training for operating PAM systems and should have familiarity with the vessel and associated equipment with which they will be working, to the extent practicable. PSOs can act as acoustic or visual observers (but not simultaneously) as long as they demonstrate that their training and experience are sufficient to perform each task.
2. NMFS maintains a list of currently approved PSOs. PSO names must be provided to NMFS by the operator for review and confirmation of their approval for specific roles prior to commencement of the survey[10]. For prospective PSOs not previously approved, or for PSOs whose approval is not current, NMFS must review and approve PSO qualifications. Resumes should include information related to relevant education, experience, and training, including dates, duration, location, and description of prior PSO experience. Resumes must be accompanied by relevant documentation of successful completion of necessary training.
3. NMFS may approve PSOs as conditional or unconditional. A conditionally-approved PSO may be one who is trained but has not yet attained the requisite tier- and region-specific experience. An unconditionally-approved PSO is one who has attained the necessary experience within the relevant region. For unconditional approval, the PSO

[9] Acoustic PSOs are only required for Tier 1 surveys.

[10] PSO-related inquiries should be directed to nmfs.psoreview@noaa.gov.

must have a minimum of 90 days at sea performing the role (either visual or acoustic) at the particular Tier level (1–3), with the conclusion of the most recent relevant experience not more than 18 months previous.

4. At least one of the visual and two of the acoustic PSOs (if required) aboard the vessel must be unconditionally-approved. One unconditionally-approved visual PSO must be designated as the lead for the entire PSO team. This lead should typically be the PSO with the most experience, would coordinate duty schedules and roles for the PSO team[11], and serve as primary point of contact for the vessel operator. To the maximum extent practicable, the duty schedule must be planned such that unconditionally-approved PSOs are on duty with conditionally-approved PSOs.
5. PSOs must successfully complete relevant training, including completion of all required coursework and passing (80 percent or greater) a written and/or oral examination developed for the training program. Training requirements are described in Baker et al. (2013). PSOs must have successfully attained a bachelor's degree from an accredited college or university with a major in one of the natural sciences, a minimum of 30 semester hours or equivalent in the biological sciences, and at least one undergraduate course in math or statistics. The educational requirements may be waived if the PSO has acquired the relevant skills through alternate experience. Requests for such a waiver must be submitted to NMFS and must include written justification. Requests must be granted or denied (with justification) by NMFS within one week of receipt of submitted information. Alternate experience that may be considered includes, but is not limited to
    a) secondary education and/or experience comparable to PSO duties
    b) previous work experience conducting academic, commercial, or government-sponsored protected species surveys
    c) previous work experience as a PSO (PSO must be in good standing and demonstrate good performance of PSO duties)
    d) traditional knowledge (in Alaska only).

A.5.2. Equipment

The operator is required to adhere to the following:

1. For Tier 1 surveys only (see below), provide PSOs with reticle bigeye binoculars (e.g., 25 x 150; 2.7 view angle; individual ocular focus; height control[12]) of appropriate capability solely for PSO use. These must be pedestal-mounted on the deck at the most appropriate vantage point that provides for optimal sea surface observation, PSO safety, and safe operation of the vessel.
2. Each survey required to have PAM will include a passive acoustic monitoring system that has been verified and tested by the acoustic PSO prior to or during the initiation of survey activities.
3. Work with the selected third-party observer provider to ensure PSOs have all equipment (including backup equipment) needed to adequately perform necessary tasks, including accurate determination of distance and bearing to observed marine mammals, and to ensure that PSOs are capable of calibrating equipment as necessary for accurate distance estimates and species identification. Such equipment, at a minimum, must include:
    a) At least one thermal (infrared) imaging device suited for the marine environment (BOEM program specific).
    b) Reticle binoculars (e.g., 7 x 50) of appropriate quality (at least one per PSO, plus backups).
    c) Global Positioning Units (GPS) (at least one plus backups).

[11] Responsibility for coordination of duty schedules and roles may be delegated, such as to a shore-based monitoring coordinator employed by the third-party observer provider.

[12] Equipment specifications are provided as examples with regard to appropriate capability only.

d) Digital cameras with a telephoto lens that is at least 300 mm or equivalent on a full-frame single lens reflex (SLR) (at least one plus backups). The camera or lens should also have an image stabilization system.
e) Equipment necessary for accurate measurement of distances to protected species.
f) Compasses (at least one plus backups).
g) Means of communication among vessel crew and PSOs.
h) Any other tools deemed necessary to adequately and effectively perform PSO tasks.

Equipment specified in (a) through (g) above may be provided by an individual PSO, the third - party observer provider, or the operator, but the latter is responsible for ensuring PSOs have the proper equipment required to perform the duties specified within these protocols.

A.6. TIER-SPECIFIC SURVEY PROJECT CRITERIA

For purposes of defining mitigation requirements, we differentiate here between requirements for the three survey "tiers" that may reasonably be associated with potential for impacts to protected species (refer to definitions given earlier). Protocols associated with each tier are detailed below.

A.6.1. Tier 1 Survey Project Criteria

Tier 1 survey protocols are generally considered applicable to surveys using airgun arrays with a total volume greater than 1,500 in^3, or with 12 or more airguns. See Table A-1.

Visual Monitoring

1. During survey operations (e.g., any day on which use of the acoustic source is planned to occur, and whenever the acoustic source is in the water, whether activated or not), a minimum of two PSOs must be on duty and conducting visual observations at all times during daylight hours (i.e., from 30 minutes prior to sunrise through 30 minutes following sunset).
2. Visual monitoring must begin no less than 30 minutes prior to ramp-up and must continue until one hour after use of the acoustic source ceases or until 30 minutes past sunset.
3. Visual PSOs must coordinate to ensure 360° visual coverage around the vessel from the most appropriate observation posts and must conduct visual observations using binoculars and the naked eye while free from distractions and in a consistent, systematic, and diligent manner.
4. PSOs must establish and monitor applicable shutdown and buffer zones (see below). These zones must be based upon the radial distance from the edges of the airgun array (rather than being based on the center of the array or around the vessel itself). During use of the acoustic source (i.e., anytime the acoustic source is active, including ramp-up), occurrence of protected species within the relevant buffer zone (but outside the shutdown zone) should be communicated to the operator to prepare for the potential shutdown of the acoustic source.
5. Three shutdown zones are defined, depending on the species and context. A standard shutdown zone encompassing the area at and below the sea surface out to a radius of 500 meters (m) from the edges of the airgun array (0–500 m) is defined for marine mammals. For special circumstances, the shutdown zone encompasses an extended distance of 1,500 meters (0–1,500 meters, see Table A-2). For sea turtles, a standard shutdown zone of 150 meters (0–150 meters) from the edges of the airgun array applies.
6. During pre-start clearance monitoring (i.e., before ramp-up begins), the buffer zone acts as an extension of the shutdown zone in that observations of protected species within the buffer zone would also preclude airgun operations from beginning (i.e., ramp-up). Pre- start clearance zones are defined as follows. For all marine mammals (other than special circumstances), the pre-start clearance zone encompasses the area at and below the sea surface from the edge of the 500-meter shutdown zone out to a radius of 1,000 meters from the edges of the airgun array. For sea turtles, the pre-start clearance

zone is the same as the shutdown zone (150 m). No buffer is added to the extended distance shutdown zone (1,500 m).

7. Visual PSOs must immediately communicate all observations of marine mammals to the on-duty acoustic PSO(s), including any determination by the PSO regarding species identification, distance, and bearing and the degree of confidence in the determination.
8. Any observations of protected species by crew members aboard any vessel associated with the survey must be relayed to the PSO team.
9. During good conditions (e.g., daylight hours; Beaufort sea state (BSS) 3 or less), visual PSOs must conduct observations when the acoustic source is not operating for comparison of sighting rates and behavior with and without use of the acoustic source and between acquisition periods, to the maximum extent practicable.
10. Visual PSOs may be on watch for a maximum of four consecutive hours followed by a break of at least one hour between watches and may conduct a maximum of 12 hours of observation per 24-hour period. Combined observational duties (visual and acoustic but not at the same time) may not exceed 12 hours per 24-hour period for any individual PSO.

Acoustic Monitoring[13]

1. Source vessels must use a towed PAM system at all times[14], which must be monitored by a minimum of one acoustic PSO beginning at least 30 minutes prior to ramp-up, at all times during use of the acoustic source, and until one hour after use of the acoustic source ceases. Remote acoustic PSOs may be utilized in conjunction with at least one vessel- based, unconditionally approved acoustic PSO.
2. Acoustic PSOs must immediately communicate all detections of marine mammals to visual PSOs (when visual PSOs are on duty), including any determination by the PSO regarding species identification, distance and bearing, and the degree of confidence in the determination.
3. Acoustic PSOs may be on watch for a maximum of four consecutive hours followed by a break of at least one hour between watches and may conduct a maximum of 12 hours of observation per 24-hour period. Combined observational duties (acoustic and visual but not at the same time) may not exceed 12 hours per 24-hour period for any individual PSO.
4. Survey activity may continue for 30 minutes when the PAM system malfunctions or is damaged, while the PAM operator diagnoses the issue. If the diagnosis indicates that the PAM system must be repaired to solve the problem, operations may continue for an additional five hours without acoustic monitoring during daylight hours only under the following conditions:
    a) Sea state is less than or equal to BSS 4.
    b) No marine mammals (excluding delphinids) detected solely by PAM in the applicable shutdown zone in the previous two hours.
    c) NMFS and BSEE[15] are notified via email as soon as practicable with the time and location in which operations began occurring without an active PAM system.
    d) Operations with an active acoustic source, but without an operating PAM system, do not exceed a cumulative total of ten hours in any 24-hour period.

[13] See PAM Requirements for further detail.

[14] PAM may not be required when certain circumstances are present. For example, in the GOM, use of towed PAM is not required for surveys operating in water depths shallower than 100 meters, and PAM is not required in Cook Inlet, Alaska.

[15] Notifications to BSEE required for survey activities related to oil and gas, renewable energy, or marine minerals programs in Federal waters.

Table A-2. Extended Distance, Shutdown Zone, Species and Context[a].

Species and/or Group	Shutdown Zone (meters) Tier 1	Shutdown Zone (meters) Tier 2/3
North Atlantic right whale (*Eubalaena glacialis*)	0-1,500	0-500
North Pacific right whale (*Eubalaena japonica*)	0-1,500	0-500
Rice's whale (*Balaenoptera ricei*)	0–1,500	0–500
Beaked whales (*Ziphiidae spp.*)	0–1,500	0–500
Dwarf and pygmy sperm whales (*Kogia spp.*)	0–1,500	0–500
Southern resident killer whale (*Orcinus orca*)	0-1,500	0-500
Cook Inlet beluga whales (*Delphinapterus leucas*)	0-1,500	0-500
Large whale with calf[b]	0–1,500	0–500
Groups (6+) of large whales	0–1,500	0–500

[a] This list is not exhaustive. Other species or circumstances may warrant use of the extended shutdown zone in certain situations.

[b] "Large whale" is defined as a sperm whale or any baleen whale; calf defined as an animal less than two -thirds the body size of an adult observed to be in close association with an adult.

Pre-Start Clearance and Ramp-Up

A ramp-up procedure, involving a step-wise increase in the number of airguns firing and total active array volume until all operational airguns are activated and the full volume is achieved, is required at all times as part of the activation of the acoustic source. A 30-minute pre-start clearance observation period must occur prior to the start of ramp-up. The intent of pre-start clearance observation (30 minutes) is to ensure no protected species are within the shutdown zones, and buffer zone if applicable, prior to the beginning of ramp-up. The only time detections of protected species in the buffer zone would prevent operations is during pre-start clearance (i.e., the beginning of ramp-up). The intent of ramp-up is to warn protected species of pending operations and to allow sufficient time for those animals to leave the immediate vicinity. All operators must adhere to the following pre-start clearance and ramp-up requirements:

1. The operator must notify a designated PSO of the planned start of ramp-up as agreed upon with the lead PSO; the notification time should not be less than 60 minutes prior to the planned ramp-up in order to allow the PSOs time to monitor the shutdown and buffer zones for 30 minutes prior to the initiation of ramp-up (pre-start clearance). During this 30 minute pre-start clearance period the entire applicable shutdown and buffer zones must be visible, except as indicated in #7 below.
2. Ramp-ups must be scheduled so as to minimize the time spent with the source activated prior to the start of acquisition.
3. A visual PSO conducting pre-start clearance observations must be notified again immediately prior to initiating ramp-up procedures and the operator must receive confirmation from the PSO to proceed.
4. Any PSO on duty has the authority to delay the start of survey operations if a protected species is detected within the applicable pre-start clearance zone.
5. The operator must establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the acoustic source to ensure that mitigation commands are conveyed swiftly while allowing PSOs to maintain watch.
6. When both visual and acoustic PSOs are on duty, all detections of marine mammals must be immediately communicated to the entire on-duty PSO team for potential verification of visual observations by the acoustic PSO or of acoustic detections by visual PSOs.
7. Ramp-up may not be initiated if any protected species is within the applicable shutdown or buffer zone. If a protected species is observed within the applicable shutdown zone or the buffer zone during the 30 minute pre-start clearance period, ramp-up may not begin until the animal(s) has been observed exiting the zones or until an additional time period

has elapsed with no further sightings (15 minutes for small odontocetes and pinnipeds and 30 minutes for all other species).

8. Ramp-up must begin by activating a single airgun of the smallest volume in the array and must continue in stages by doubling the number of active elements at the commencement of each stage, with each stage of approximately the same duration. Total ramp-up duration must not be less than 20 minutes. The operator must provide information to the PSO documenting appropriate procedures were followed.
9. PSOs must monitor the shutdown and buffer zones 30 minutes before and during ramp-up, and ramp-up must cease and the source must be shut down upon detection of a protected species within the applicable shutdown zone. Once ramp-up has begun, detections of protected species within the buffer zone do not require shutdown, but such detection must be recorded and communicated to the operator to prepare for potential shutdown.
10. Ramp-up may occur at times of poor visibility, including nighttime, if appropriate acoustic monitoring has occurred with no detections of protected species within the pre- start clearance zone in the 30 minutes prior to beginning ramp-up. Acoustic source activation may only occur at night where operational planning cannot reasonably avoid such circumstances.
11. If the acoustic source is shut down for brief periods (i.e., less than 30 minutes) for reasons other than implementation of prescribed mitigation (e.g., mechanical difficulty), it may be activated again without ramp-up if PSOs have maintained constant visual and/or acoustic observation and no visual or acoustic detections of protected species have occurred within the pre-start clearance zone. For any longer shutdown, pre-start clearance observation and ramp-up are required.
12. Testing of the acoustic source involving all elements requires ramp-up. Testing limited to individual source elements or strings does not require ramp-up but does require a 30-minute pre-start clearance period.

Shutdown

All operators must adhere to the following shutdown requirements.

1. Any PSO on duty has the authority to call for shutdown of the acoustic source if a protected species is detected within the applicable shutdown zone.
2. The operator must establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the acoustic source to ensure that shutdown commands are conveyed swiftly while allowing PSOs to maintain watch.
3. When both visual and acoustic PSOs are on duty, all detections of marine mammals must be immediately communicated to the entire on-duty PSO team for potential verification of visual observations by the acoustic PSO or of acoustic detections by visual PSOs.
4. When the airgun array is active (i.e., anytime one or more airguns is active, including during ramp-up) and (1) a protected species appears within or enters the applicable shutdown zone and/or (2) a marine mammal (excluding delphinids) is detected acoustically and localized within the applicable shutdown zone, the acoustic source must be shut down. When shutdown is instructed by a PSO, the acoustic source must be immediately deactivated and any dispute resolved only following deactivation.
5. The shutdown requirement is waived for small delphinids[16] and pinnipeds[17]. If a delphinid (individual belonging to the indicated genera of the Family Delphinidae) or pinniped is visually detected within the shutdown zone, no shutdown is required unless the PSO confirms the individual to be of a genus other than those listed, in which case a shutdown is required. Acoustic detection of delphinids does not require shutdown.

[16] Applicable genera will be specific to the region and include the following: *Delphinus, Lagenodelphis, Lagenorhynchus, Lissodelphis, Stenella, Steno,* and *Tursiops*. This list may be revised as taxonomy changes.

[17] Waiver for pinnipeds may not be applicable for surveys that may affect ESA-listed pinnipeds.

6. If there is uncertainty regarding identification of a marine mammal species (i.e., whether the observed marine mammal(s) belongs to one of the delphinid genera for which shutdown is waived or one of the species with a larger shutdown zone), PSOs may use best professional judgment in making the decision to call for a shutdown.
7. Upon implementation of shutdown, the source may be reactivated after the protected species has been observed exiting the applicable shutdown zone (i.e., animal is not required to fully exit the buffer zone where applicable) or following a clearance period (15 minutes for small odontocetes and 30 minutes for all other species) with no further detection of the protected species. For sea turtles observed in the shutdown zone, a shutdown not requiring ramp-up (i.e., a "pause") is to be implemented until the sea turtle is no longer observed in the shutdown zone.

A.6.2. Tier 2 Survey Protocols

Tier 2 survey protocols are generally considered applicable to surveys using airgun arrays of 1,500 in^3 volume or smaller and 12 airguns or fewer, or surveys using single airguns. See Table above.

Visual Monitoring

1. During survey operations (e.g., any day on which use of the acoustic source is planned to occur, and whenever the acoustic source is in the water, whether activated or not), a minimum of two PSOs must be on duty and conducting visual observations at all times during daylight hours (i.e., from 30 minutes prior to sunrise through 30 minutes following sunset).
2. Visual monitoring must begin no less than 30 minutes prior to ramp-up and must continue until one hour after use of the acoustic source ceases or until 30 minutes past sunset.
3. Visual PSOs must coordinate to ensure 360° visual coverage around the vessel from the most appropriate observation posts and must conduct visual observations using binoculars and the naked eye while free from distractions and in a consistent, systematic, and diligent manner.
4. PSOs must establish and monitor applicable shutdown and buffer zones (see below). These zones must be based upon the radial distance from the edges of the airgun array (or single airgun) (rather than being based on the center of the array or around the vessel itself). During use of the acoustic source (i.e., anytime the acoustic source is active, including ramp-up), occurrence of protected species within the relevant buffer zone (but outside the shutdown zone) should be communicated to the operator to prepare for the potential shutdown of the acoustic source.
5. Two shutdown zones are defined, depending on the species and context. Here, a standard shutdown zone encompassing the area at and below the sea surface out to a radius of 100 meters from the edges of the airgun array (0–100 meters) is defined for marine mammals and sea turtles. For special circumstances, the shutdown zone encompasses an extended distance of 500 meters (0-500 meters, see Table A-2).
6. During pre-start clearance monitoring (i.e., before ramp-up begins), the buffer zone also acts as an extension of the shutdown zone in that observations of protected species within the buffer zone would also preclude airgun operations from beginning (i.e., ramp-up). Pre-start clearance zones are defined as follows. For all marine mammals (other than special circumstances), the pre-start clearance zone encompasses the area at and below the sea surface from the edge of the 100-meter shutdown zone out to a radius of 200 meters from the edges of the airgun array (or single airgun). For sea turtles, the pre-start clearance zone encompasses the area at and below the sea surface from the edge of the 100-meter shutdown zone. No buffer is added to the extended distance shutdown zone (500 m).
7. Any observations of protected species by crew members aboard any vessel associated with the survey must be relayed to the PSO team.

8. During good conditions (e.g., daylight hours; Beaufort sea state (BSS) 3 or less), visual PSOs must conduct observations when the acoustic source is not operating for comparison of sighting rates and behavior with and without use of the acoustic source and between acquisition periods, to the maximum extent practicable.
9. Visual PSOs may be on watch for a maximum of four consecutive hours followed by a break of at least one hour between watches and may conduct a maximum of 12 hours of observation per 24-hour period.

Pre-Start Clearance and Ramp-Up

A ramp-up procedure, involving a step-wise increase in the number of airguns firing and total active array volume until all operational airguns are activated and the full volume is achieved, is required at all times as part of the activation of the acoustic source. Ramp-up is not relevant for surveys using a single airgun as the acoustic source. A 30-minute pre-start clearance observation period must occur prior to the start of ramp-up. The intent of pre-start clearance observation (30 minutes) is to ensure no protected species are within the shutdown zones, and buffer zone if applicable, prior to the beginning of ramp-up. The only time detections of protected species in the buffer zone would prevent operations is during pre-start clearance (i.e., the beginning of ramp-up). The intent of ramp-up is to warn protected species of pending operations and to allow sufficient time for those animals to leave the immediate vicinity. All operators must adhere to the following pre-start clearance and ramp-up requirements:

1. The operator must notify a designated PSO of the planned start of ramp-up as agreed upon with the lead PSO; the notification time should not be less than 60 minutes prior to the planned ramp-up in order to allow the PSOs time to monitor the shutdown and buffer zones for 30 minutes prior to the initiation of ramp-up (pre-start clearance). During this 30 minute pre-start clearance period the entire applicable shutdown and buffer zones must be visible, except as indicated in #7 below.
2. Ramp-ups must be scheduled so as to minimize the time spent with the source activated prior to the start of acquisition.
3. A visual PSO conducting pre-start clearance observations must be notified again immediately prior to initiating ramp-up procedures and the operator must receive confirmation from the PSO to proceed.
4. Any PSO on duty has the authority to delay the start of survey operations if a protected species is detected within the applicable pre-start clearance zone.
5. The operator must establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the acoustic source to ensure that mitigation commands are conveyed swiftly while allowing PSOs to maintain watch.
6. Ramp-up may not be initiated if any protected species is within the applicable shutdown or buffer zone. If a protected species is observed within the applicable shutdown zone or the buffer zone during the 30-minute pre-start clearance period, ramp-up may not begin until the animal(s) has been observed exiting the zones or until an additional time period has elapsed with no further sightings (15 minutes for small odontocetes and pinnipeds and 30 minutes for all other species).
7. Ramp-up must begin by activating a single airgun of the smallest volume in the array and must continue in stages by doubling the number of active elements at the commencement of each stage, with each stage of approximately the same duration. Total ramp-up duration will be dependent on the number of array elements. The operator must provide information to the PSO documenting appropriate procedures were followed.
8. PSOs must monitor the shutdown and buffer zones 30 minutes before and during ramp-up, and ramp-up must cease and the source must be shut down upon observation of a protected species within the applicable shutdown zone. Once ramp-up has begun, observations of protected species within the buffer zone do not require shutdown, but such observation must be recorded and communicated to the operator to prepare for potential shutdown.

9. Ramp-up may occur at times of poor visibility, including nighttime, if appropriate visual monitoring has occurred with no detections of protected species in the 30 minutes prior to beginning ramp-up. Acoustic source activation may only occur at night where operational planning cannot reasonably avoid such circumstances.
10. If the acoustic source is shut down for brief periods (i.e., less than 30 minutes) for reasons other than implementation of prescribed mitigation (e.g., mechanical difficulty), it may be activated again without ramp-up if PSOs have maintained constant visual observation and no detections of protected species have occurred within the applicable shutdown zone. For any longer shutdown, pre-start clearance observation and ramp-up are required.
11. Testing of the acoustic source involving all elements requires ramp-up. Testing limited to individual source elements or strings does not require ramp-up but does require a 30-minute pre-start clearance period.

Shutdown

All operators must adhere to the following shutdown requirements.

1. Any PSO on duty has the authority to call for shutdown of the acoustic source if a protected species is detected within the applicable shutdown zone.
2. The operator must establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the acoustic source to ensure that shutdown commands are conveyed swiftly while allowing PSOs to maintain watch.
3. When the acoustic source is active (i.e., anytime one or more airguns is active, including during ramp-up) and a protected species appears within or enters the applicable shutdown zone, the acoustic source must be shut down. When shutdown is instructed by a PSO, the acoustic source must be immediately deactivated and any dispute resolved only following deactivation.
4. The shutdown requirement is waived for small delphinids and pinnipeds. If a delphinid (individual belonging to the indicated genera of the Family Delphinidae) or pinniped is visually detected within the shutdown zone, no shutdown is required unless the PSO confirms the individual to be of a genus other than those listed, in which case a shutdown is required.
5. If there is uncertainty regarding identification of a marine mammal species (i.e., whether the observed marine mammal(s) belongs to one of the delphinid genera for which shutdown is waived or one of the species with a larger shutdown zone), PSOs may use best professional judgment in making the decision to call for a shutdown.
6. Upon implementation of shutdown, the source may be reactivated after the protected species has been observed exiting the applicable shutdown zone (i.e., animal is not required to fully exit the buffer zone where applicable) or following a clearance period (15 minutes for small odontocetes and 30 minutes for all other species) with no further detection of the marine mammal(s). For sea turtles observed in the shutdown zone, a shutdown not requiring ramp-up (i.e., a “pause”) is to be implemented until the sea turtle is no longer observed in the shutdown zone.

A.6.3. Tier 3 Survey Protocols

Tier 3 survey protocols are generally considered applicable to surveys using sparkers and some other sources that have not yet been fully evaluated to the point that a final determination has been made about their tiering (e.g., 1- and 2-plate boomers and bubble guns). Operators may elect to implement Tier 3 mitigation protocols to avoid potential take of marine mammals or may instead elect to request an incidental take authorization under the MMPA in lieu of implementing these protocols. See Table above.

Visual Monitoring

1. During survey operations (e.g., any day on which use of the acoustic source is planned to occur, and whenever the acoustic source is in the water, whether activated or not), a

minimum of one PSO must be on duty and conducting visual observations at all times during daylight hours (i.e., from 30 minutes prior to sunrise through 30 minutes following sunset).

2. Qualified shipboard personnel may be designated by the operator to fulfill these roles during Federally funded/conducted research. PSOs must be NMFS-approved for other Tier 3 survey effort.
3. Visual monitoring must begin no less than 30 minutes prior to ramp-up and must continue until one hour after use of the acoustic source ceases or until 30 minutes past sunset.
4. Visual PSOs must coordinate to ensure 360° visual coverage around the vessel from the most appropriate observation posts and must conduct visual observations using binoculars and the naked eye while free from distractions and in a consistent, systematic, and diligent manner.
5. PSOs must establish and monitor applicable shutdown zones (see below). These zones must be based upon the radial distance from the acoustic source (rather than being based around the vessel itself).
6. Two shutdown zones are defined, depending on the species and context. Here, a standard shutdown zone encompassing the area at and below the sea surface out to a radius of 100 meters from the sound source (0–100 meters) is defined for marine mammals and sea turtles. For special circumstances, the shutdown zone encompasses an extended distance of 500 meters (0-500 meters, see Table A-2).
7. Any observations of protected species by crew members aboard any vessel associated with the survey must be relayed to the PSO team.
8. Visual PSOs may be on watch for a maximum of four consecutive hours followed by a break of at least one hour between watches and may conduct a maximum of 12 hours of observation per 24-hour period.

Pre-start Clearance and Ramp-up

A ramp-up procedure, involving a gradual increase in source level output, is required at all times as part of the activation of the acoustic source when technically feasible. Operators should ramp up sources to half power for 5 minutes and then proceed to full power. A 30-minute pre-start clearance observation period must occur prior to the start of ramp-up. The intent of pre-start clearance observation (30 minutes) is to ensure no protected species are within the shutdown zones prior to the beginning of ramp-up. The intent of ramp-up is to warn protected species of pending operations and to allow sufficient time for those animals to leave the immediate vicinity. All operators must adhere to the following pre-start clearance and ramp-up requirements:

1. The operator must notify a designated PSO of the planned start of ramp-up as agreed upon with the lead PSO; the notification time should not be less than 60 minutes prior to the planned ramp-up in order to allow the PSOs time to monitor the shutdown zones for 30 minutes prior to the initiation of ramp-up (pre-start clearance). During this 30-minute pre-start clearance period the entire applicable shutdown zone must be visible, except as indicated below (see #7 below).
2. Ramp-ups must be scheduled so as to minimize the time spent with the source activated.
3. A visual PSO conducting pre-start clearance observations must be notified again immediately prior to initiating ramp-up procedures and the operator must receive confirmation from the PSO to proceed.
4. Any PSO on duty has the authority to delay the start of survey operations if a protected species is detected within the applicable pre-start clearance zone.
5. The operator must establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the acoustic source to ensure that mitigation commands are conveyed swiftly while allowing PSOs to maintain watch.
6. Ramp-up may not be initiated if any protected species is within the applicable shutdown zone. If a protected species is observed within the applicable shutdown zone during the

30-minute pre-start clearance period, ramp-up may not begin until the animal(s) has been observed exiting the zones or until an additional time period has elapsed with no further sightings (15 minutes for small odontocetes and pinnipeds and 30 minutes for all other species).

7. PSOs must monitor the shutdown zones 30 minutes before and during ramp-up, and ramp-up must cease and the source must be shut down upon observation of a protected species within the applicable shutdown zone.
8. Ramp-up may occur at times of poor visibility, including nighttime, if appropriate visual monitoring has occurred with no detections of protected species in the 30 minutes prior to beginning ramp-up. Acoustic source activation may only occur at night where operational planning cannot reasonably avoid such circumstances.
9. If the acoustic source is shut down for brief periods (i.e., less than 30 minutes) for reasons other than implementation of prescribed mitigation (e.g., mechanical difficulty), it may be activated again without ramp-up if PSOs have maintained constant visual observation and no detections of protected species have occurred within the applicable shutdown zone. For any longer shutdown, pre-start clearance observation and ramp-up are required.

Shutdown

All operators must adhere to the following shutdown requirements:

1. Any PSO on duty has the authority to call for shutdown of the acoustic source if a protected species is detected within the applicable shutdown zone.
2. The operator must establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the acoustic source to ensure that shutdown commands are conveyed swiftly while allowing PSOs to maintain watch.
3. When the acoustic source is active and a protected species appears within or enters the applicable shutdown zone, the acoustic source must be shut down. When shutdown is instructed by a PSO, the acoustic source must be immediately deactivated and any dispute resolved only following deactivation.
4. The shutdown requirement is waived for small delphinids and pinnipeds. If a delphinid (individual belonging to the indicated genera of the Family Delphinidae) or pinniped is visually detected within the shutdown zone, no shutdown is required unless the PSO confirms the individual to be of a genus other than those listed, in which case a shutdown is required.
5. If there is uncertainty regarding identification of a marine mammal species (i.e., whether the observed marine mammal(s) belongs to one of the delphinid genera for which shutdown is waived or one of the species with a larger shutdown zone), PSOs may use best professional judgment in making the decision to call for a shutdown.
6. Upon implementation of shutdown, the source may be reactivated after the protected species has been observed exiting the applicable shutdown zone or following a clearance period (15 minutes for small odontocetes and 30 minutes for all other species) with no further detection of the protected species. For sea turtles observed in the shutdown zone, a voluntary shutdown not requiring ramp-up (i.e., a “pause”) may be implemented until the sea turtle is no longer observed in the shutdown zone.

A.7. Additional Standard project Criteria

The following protocols are required when relevant, regardless of tier.

A.7.1. Entanglement and Entrainment Risk Reduction

All lines (rope, chain, cable, etc.) associated with geophysical surveys should be stiff, taut, and non-looping to the extent practicable to avoid possible entanglement and entrainment risk. When feasible, flexible lines such as nylon or polypropylene that could loop or tangle protected species should be enclosed in a sleeve to add rigidity and prevent looping or tangling. No

excess underwater line is allowed. Equipment, especially towed apparatuses (e.g., tail buoys), must be operated in a way as to prevent entrainment of sea turtles or other protected species to the extent feasible.

A.7.2. Nodal Survey Requirements

To avoid the risk of entanglement, BOEM permit-holders conducting surveys using ocean- bottom nodes or similar gear must:

1. Use negatively buoyant coated wire-core tether cable.
2. Ensure all cables/lines are designed to be rigid.
3. Retrieve all lines immediately following completion of the survey.
4. Attach acoustic pingers directly to the coated tether cable; acoustic releases should not be used.

A.8. Vessel Strike Avoidance Requirements

Crew and supply vessel personnel should use an appropriate reference guide that includes identifying information on all marine mammals, sea turtles, and other marine aquatic protected species that may be encountered. Vessel operators must comply with the below measures except under extraordinary circumstances when the **safety of the vessel or crew is in doubt or the safety of life at sea is in question**. These requirements do not apply in any case where compliance would create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of the restriction, cannot comply (e.g., having an array).

1. Vessel operators and crews must maintain a vigilant watch for all protected species and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any protected species. A single protected species at the surface may indicate the presence of submerged animals in the vicinity of the vessel; therefore, precautionary measures should always be exercised. A visual observer aboard the vessel must monitor a vessel strike avoidance zone around the vessel (species-specific distances detailed below). Visual observers monitoring the vessel strike avoidance zone may be third-party observers (i.e., PSOs) or crew members, but crew members responsible for these duties must be provided sufficient training[18] to 1) distinguish protected species from other phenomena and 2) broadly to identify a marine mammal as a right whale, other whale (defined in this context as sperm whales or baleen whales other than right whales), or other marine mammals.
2. All vessels (e.g., source vessels, chase vessels, supply vessels), regardless of size, must observe a 10-knot speed restriction in specific areas designated by NMFS for the protection of North Atlantic right whales from vessel strikes. These include all Seasonal Management Areas (SMA) (when in effect) and any dynamic management areas (DMA) (when in effect). See https://www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-vessel-strikes-north-atlantic-right-whales for specific detail regarding these areas.
3. In the GOM, all vessels (e.g., source vessels, chase vessels, supply vessels), regardless of size, must observe a 10-knot speed restriction in the 2020 Rice's Whale Area (2020 RWA), as identified in the Biological and Conference Opinion on Bureau of Ocean Energy Management's Oil and Gas Program Activities in the Gulf of America, which is the area from 100- to 400- meter isobaths from 87.5º W to 27.5º N plus an additional 10 km around that area.
4. In the Gulf of Alaska and Bering Sea, all vessels (e.g., source vessels, chase vessels, supply vessels), regardless of size, must observe a 10-knot speed restriction while within designated North Pacific right whale critical habitat.

[18] For example, see the U.S. Navy's Marine Species Awareness Training at https://www.youtube.com/watch?v=D1_uLRdzWxA

5. Vessel speeds must also be reduced to 10 knots or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near a vessel.
6. All vessels must maintain a minimum separation distance of 500 m from right whales. If a right whale is sighted within the relevant separation distance, the vessel must steer a course away at 10 knots or less until the 500-m separation distance has been established. If a whale is observed but cannot be confirmed as a species other than a right whale, the vessel operator must assume that it is a right whale and take appropriate action. In the GOM, this requirement is expanded to include any species of baleen whale.
7. All vessels must maintain a minimum separation distance of 100 m from sperm whales and all other baleen whales.
8. All vessels must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 m from all other protected species, with an understanding that at times this may not be possible (e.g., for animals that approach the vessel).
9. When protected species are sighted while a vessel is underway, the vessel must take action as necessary to avoid violating the relevant separation distance (e.g., attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area, reduce speed and shift the engine to neutral). This does not apply to any vessel towing gear or any vessel that is navigationally constrained.

A.9. DATA COLLECTION[19]

PSOs must use standardized electronic data forms to record data. PSOs must record detailed information about any implementation of mitigation requirements, including the distance of protected species to the acoustic source and description of specific actions that ensued, the behavior of the animal(s), any observed changes in behavior before and after implementation of mitigation, and if shutdown was implemented, the length of time before any subsequent ramp-up of the acoustic source. If required mitigation was not implemented, PSOs should record a description of the circumstances. At a minimum, the following information must be recorded:

1. Vessel names (source vessel and other vessels associated with survey), vessel size and type, maximum speed capability of vessel[20].
2. Dates of departures and returns to port with port name.
3. PSO names and affiliations.
4. Date and participants of PSO briefings (as discussed in **A.4. General Requirements**, item 2).
5. Visual monitoring equipment used.
6. PSO location on vessel and height of observation location above water surface.
7. Dates and times (Greenwich Mean Time) of survey on/off effort and times corresponding with PSO on/off effort.
8. Vessel location (decimal degrees) when survey effort begins and ends and vessel location at beginning and end of visual PSO duty shifts.
9. Vessel location at 30-second intervals if obtainable from data collection software, otherwise at practical regular interval.
10. Vessel heading and speed at beginning and end of visual PSO duty shifts and upon any change.
11. Water depth (if obtainable from data collection software).

[19] Data Collection and Reporting (below) requirements reference requirements that may be transmitted to an operator via permit, ITA, ITS, and/or lease stipulations. Outside of these contexts, data collection and reporting may not be required.

[20] Data collection requirements referencing vessels and related data are not applicable to surveys conducted with a stationary acoustic source, e.g., zero-offset VSP.

12. Environmental conditions while on visual survey (at beginning and end of PSO shift and whenever conditions change significantly), including BSS and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon.
13. Factors that may contribute to impaired observations during each PSO shift change or as needed as environmental conditions change (e.g., vessel traffic, equipment malfunctions).
14. Survey activity information (and changes thereof), such as acoustic source power output while in operation, number and volume of airguns operating in an array, tow depth of an acoustic source, and any other notes of significance (i.e., pre-start clearance, ramp-up, shutdown, testing, shooting, ramp-up completion, end of operations, streamers, etc.).
15. Upon visual observation of any protected species, the following information:
    a) Watch status (sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform).
    b) Vessel/platform/survey activity at time of sighting (e.g., deploying, recovering, testing, shooting, data acquisition, other).
    c) PSO who sighted the animal.
    d) Time of sighting.
    e) Initial detection method.
    f) Sightings cue.
    g) Vessel location at time of sighting (decimal degrees).
    h) Water depth.
    i) Direction of vessel's travel (compass direction).
    j) Speed of the vessel(s) from which the observation was made.
    k) Direction of animal's travel relative to the vessel.
    l) Identification of the animal (e.g., genus/species, lowest possible taxonomic level, or unidentified), and the composition of the group if there is a mix of species.
    m) Species reliability (an indicator of confidence in identification).
    n) Estimated distance to the animal and method of estimating distance.
    o) Estimated number of animals (high/low/best).
    p) Estimated number of animals by cohort (e.g., adults, yearlings, juveniles, calves, group composition).
    q) Description (as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars or markings, shape and size of dorsal fin, shape of head, and blow characteristics).
    r) Detailed behavior observations (e.g., number of blows/breaths, number of surfaces, breaching, spyhopping, diving, feeding, traveling; as explicit and detailed as possible; note any observed changes in behavior before and after point of closest approach).
    s) Animal's closest point of approach and/or closest distance from any element of the acoustic source.
    t) Description of any actions implemented in response to the sighting (e.g., delays, shutdown, ramp-up) and time and location of the action.
16. If a marine mammal is detected using a PAM system, the following additional information should be recorded:
    a) An acoustic encounter identification number, and whether the detection was linked with a visual sighting.
    b) Date and time when first and last heard.
    c) Types and nature of sounds heard (e.g., clicks, whistles, creaks, burst pulses, continuous, sporadic, strength of signal).

d) Any additional information recorded such as water depth of the hydrophone array, bearing of the animal to the vessel (if determinable), species or taxonomic group (if determinable), spectrogram screenshot, and any other notable information.

A.10. REPORTING[21]

1. The operator must submit a draft comprehensive report (see ITA and/or permit for contact information) on all activities and monitoring results within 90 days of the completion of the survey or expiration of the ITA and/or permit, whichever comes sooner. The report must describe all activities conducted and sightings of protected species, must provide full documentation of methods, results, and interpretation pertaining to all monitoring, and must summarize the dates and locations of survey operations and all protected species sightings (dates, times, locations, activities, associated survey activities). The draft report must also include geo-referenced time-stamped vessel tracklines for all time periods during which acoustic sources were operating. Tracklines should include points recording any change in acoustic source status (e.g., when the sources began operating, when they were turned off, or when they changed operational status such as from full array to single airgun or vice versa). GIS files must be provided in ESRI shapefile format and include the UTC date and time, latitude in decimal degrees, and longitude in decimal degrees. All coordinates must be referenced to the WGS84 geographic coordinate system. In addition to the report, all raw observational data must be made available. The report must summarize the information submitted in interim monthly reports (if required) as well as additional data collected as described above in *Data Collection*. A final report must be submitted within 30 days following resolution of any comments on the draft report.
2. For operations requiring the use of PAM, the report must include a validation document concerning the use of PAM, which should include necessary noise validation diagrams and demonstrate whether background noise levels on the PAM deployment limited achievement of the planned detection goals. Copies of any vessel self-noise assessment reports must be included with the report. See **PAM Requirements** below.
3. Reporting injured or dead protected species: Sightings of any injured or dead protected species must be reported to NMFS, regardless of the cause of injury or death.

For reporting dead or injured marine mammals, refer to the reporting requirements described below. For reporting other dead or injured protected species, refer to NMFS' website at https://www.fisheries.noaa.gov/report.

In the event that personnel involved in the survey activities discover an injured or dead marine mammal, the incident must be reported to NMFS and to the applicable regional stranding network(s) as soon as feasible. The report must include the following information:

1. Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable).
2. Species identification (if known) or description of the animal(s) involved.
3. Condition of the animal(s) (including carcass condition if the animal is dead).
4. Observed behaviors of the animal(s), if alive.
5. If available, photographs or video footage of the animal(s).
6. General circumstances under which the animal was discovered.

In the event of a ship strike of a marine mammal by any vessel involved in the survey activities, the incident must be reported to NMFS and to the regional stranding network(s) as soon as feasible. The report must include the following information:

1. Time, date, and location (latitude/longitude) of the incident.
2. Species identification (if known) or description of the animal(s) involved.

[21] Reporting as required through relevant regulatory authorities and documents issued by BOEM and NMFS, if applicable, under ESA or MMPA.

3. Vessel's speed during and leading up to the incident.
4. Vessel's course/heading and what operations were being conducted (if applicable).
5. Status of all sound sources in use.
6. Description of any avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike.
7. Environmental conditions (e.g., wind speed and direction, BSS, cloud cover, visibility) immediately preceding the strike.
8. Estimated size and length of animal that was struck.
9. Description of the behavior of the marine mammal immediately preceding and/or following the strike.
10. If available, description of the presence and behavior of any other marine mammals immediately preceding the strike.
11. Estimated fate of the animal (e.g., dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared).
12. To the extent practicable, photographs or video footage of the animal(s).

Marine Mammal Stranding

Marine mammals involved in live stranding events (or near-shore atypical milling) are considered especially susceptible to the effects of additional stressors. The shutdown procedures below are not related to the investigation of the cause of any such stranding and their implementation is not intended to imply that the activity of the authorized entity is the cause of the stranding. Rather, shutdown procedures are intended to protect marine mammals exhibiting indicators of distress by minimizing their exposure to possible additional stressors, regardless of the factors that contributed to the stranding.

In the event of a live stranding (or near-shore atypical milling) event within 50 km of the survey operations, where the NMFS stranding network is engaged in herding or other interventions to return animals to the water, NMFS will advise of the need to implement shutdown procedures for all active acoustic sources operating within 50 km of the stranding. Shutdown procedures for live stranding or milling marine mammals include the following:

1. If at any time, the marine mammal(s) die or are euthanized, or if herding/intervention efforts are stopped, NMFS will advise that the shutdown around the animals' location is no longer needed.
2. Otherwise, shutdown procedures will remain in effect until NMFS determines and advises that all live animals involved have left the area (either of their own volition or following an intervention).
3. If further observations of the marine mammals indicate the potential for re-stranding, additional coordination will be required to determine what measures are necessary to minimize that likelihood (e.g., extending the shutdown or moving operations farther away) and to implement those measures as appropriate.

If NMFS determines that the circumstances of any marine mammal stranding found in the vicinity of the activity suggest investigation of the association with survey activities is warranted, and an investigation into the stranding is being pursued, NMFS will submit a written request indicating that the following initial available information must be provided as soon as possible, but no later than 7 business days after the request for information:

1. Status of all sound source use in the 48 hours preceding the estimated time of stranding and within 50 km of the discovery/notification of the stranding by NMFS.
2. If available, description of the behavior of any marine mammal(s) observed preceding (i.e., within 48 hours and 50 km) and immediately after the discovery of the stranding.

In the event that the investigation is still inconclusive, the investigation of the association of the survey activities is still warranted, and the investigation is still being pursued, NMFS may provide additional information requests, in writing, regarding the nature and location of survey operations prior to the time period above.

A.11. REFERENCES

Baker K, Epperson D, Gitschlag G, Goldstein H, Lewandowski J, Skrupky K, et al. 2013. National standards for a protected species observer and data management program: a model using geological and geophysical surveys. NOAA Technical Memorandum NMFS-OPR-49, National Marine Fisheries Service.

PAM Requirements

Towed PAM systems should consist of hardware (e.g., hydrophone array, recorder, cables) and software (e.g., data processing program and algorithm). Some type of automated detection software must be used. Acoustic signals are processed for output to the PAM operator with software designed to detect marine mammal vocalizations. Current PAM technology has some limitations (e.g., limited directional capabilities and detection range, detection of signals due to vessel and flow noise, low accuracy in localization) and there are no formal guidelines currently in place regarding specifications for hardware, software, or operator training requirements.

BOEM and NMFS' requirement to use PAM refers to the use of calibrated hydrophone arrays with full system redundancy to detect, identify, and estimate distance and bearing to vocalizing cetaceans, to the extent possible. With regard to calibration, the PAM system should have at least one calibrated hydrophone, sufficient for determining whether background noise levels on the towed PAM system are sufficiently low to meet performance expectations. Additionally, if multiple hydrophone types occur in a system (i.e., monitor different bandwidths), then one hydrophone from each such type must be calibrated, and whenever sets of hydrophones (of the same type) are sufficiently spatially separated such that they would be expected to experience ambient noise environments that differ by 6 dB or more across any integrated species cluster bandwidth, then at least one hydrophone from each set should be calibrated. In terms of calibrating the rest of the system, the signal route to the data recorder and monitoring software must be calibrated so that the binary amplitude data written to hard disk can be converted into units of acoustic pressure.

The configuration of hardware should be coupled with appropriate software to aid monitoring and listening by a PAM operator skilled in bioacoustics analysis and computer system specifications capable of running appropriate software. GPS data acquisition is recommended for all PAM operations. If the PAM plan (see below) claims an ability to localize, every localization estimate obtained from a PAM system must be accompanied by some estimate of uncertainty and ambiguity.

In the absence of formal standards addressing any of these three facets of PAM technology, all Tier 1 survey operators must provide a PAM plan including description of the hardware and software proposed for use. Following the survey, a validation document must be submitted as part of required reporting (see below). The purpose of the PAM plan is to demonstrate that the PAM system being proposed for use is adequate for addressing the mitigation goals. The plan must include methodology and documentation requirements for all stages of the project. As recommended by Thode et al. (2017), PAM plans should, at minimum, adequately address and describe (1) the hardware and software planned for use, including a hardware performance diagram demonstrating that the sensitivity and dynamic range of the hardware is appropriate for the operation; (2) deployment methodology, including target depth/tow distance; (3) definitions of expected operational conditions, used to summarize background noise statistics; (4) proposed detection-classification-localization methodology, including anticipated species clusters (using a cluster definition table), target minimum detection range for each cluster, and the proposed localization method for each cluster; (5) operation plans, including the background noise sampling schedule; (6) array design considerations for noise abatement; and (7) cluster-specific details regarding which real-time displays and automated detectors the operator would monitor. Where relevant, the plan should address the potential for PAM deployment on a receiver vessel or other associated vessel separate from the acoustic source.

Species clusters – The plan must list the species of concern during the upcoming operation. While some species may be listed individually for special attention, in many circumstances it is expected that for the purposes of a PAM operation multiple species can be grouped together in a "cluster" that shares similar acoustic and behavioral characteristics (e.g., sperm whale, beaked

whales). The plan must specify a target minimum detection (and possibly localization) range for each species cluster used in the document. Different ranges can be defined for different operational conditions. The PAM system may exceed this detection range, but must always be capable of achieving this minimum detection range.

Hardware and software specifications – The plan must have a section dedicated to demonstrating that the PAM hardware is sensitive enough to detect signals from the species clusters of concern at the target minimum detection ranges specified. The plan should include a hardware specification table and hardware performance diagram. The diagram will show the sensitivity and bandwidth of the combined array hardware and recording system, as well as the received levels required for a given species cluster to be detectable at the target minimum detection range. The overall goal of the diagram is to visually demonstrate that the planned PAM array/recording system would have the capability of detecting various species clusters at required target ranges, provided that background noise levels are not an issue.

Operational conditions – The validation document should demonstrate whether the PAM system has been compromised by excessive background noise, whether that noise is electronic interference, flow, platform, or environmental noise. Therefore, the plan must define a set of "operational conditions" under which detection statistics (background noise profiles) will be categorized during the project. Operational conditions consist of three categories: platform activity and status, mitigation (activity) status, and environmental status.

Operating procedures – The plan must describe the level of effort that is reasonably expected to occur for the monitoring requirements. For every species cluster, the plan should detail which part of the PAM display would be used for detecting that cluster. For example, if a scrolling spectrogram display is being used for a species cluster, then the spectrogram's fast Fourier transform sample size, frequency bandwidth, and their refresh rate must be specified. Similar details would be provided for other software tools, such as click detectors and other automated detectors and classifiers. The plan must also provide a screenshot of the expected monitor display.

In coordination with vessel crew, the lead PAM operator will be responsible for deployment, retrieval, and testing and optimization of the hydrophone array. While on duty, the PAM operator must diligently listen to received signals and/or monitoring display screens in order to detect vocalizing cetaceans, except as required to attend to PAM equipment. The PAM operator must use appropriate sample analysis and filtering techniques and must report all cetacean detections. While not required prior to development of formal standards for PAM use, NMFS recommends that vessel self-noise assessments be undertaken during mobilization in order to optimize PAM array configuration according to the specific noise characteristics of the vessel and equipment involved, and to refine expectations for distance/bearing estimations for cetacean species during the survey. Copies of any vessel self-noise assessment reports must be included with the summary trip report.

This report must also include a validation document concerning the use of PAM, which should include necessary noise validation diagrams (NVD) and demonstrate whether background noise levels on the PAM deployment limited achievement of the planned detection goals. A separate diagram must be produced for every background noise percentile chosen for analysis.

Background noise percentiles, rather than a simple average of the data, are required because the highly non-stationary characteristics of many background noise profiles cannot be described by a simple mean. For example, data collected during a seismic survey will have short periods of time containing high-intensity pulses and longer periods of time dominated by lower levels of reverberation. Taking a simple mean of these noise data would imply background noise levels substantially higher than what may actually have been present between seismic pulses. A validation report would typically contain between three to five diagrams, depending on the number of percentiles analyzed. At a minimum, the validation report should contain three diagrams that include the 50th percentile (median), 5th percentile, and 95th percentile. The 25th percentile and 75th percentile may also be included. In each percentile diagram, a separate background noise curve must be drawn for each defined operational condition. In general, the NVD should be generated from the data stream that is used for detecting the presence of marine mammal signals. For example, if beamforming or some other form of array gain has been applied before invoking

signal detection, then the NVD should be generated using the beamformed data, and not omnidirectional data. The complete set of NVDs, one for each percentile of interest, combined with a table that lists the fraction of time the activity was in each operational state, provides a means of reviewing the background noise-limitations encountered by the PAM system during various operational conditions. Actual marine mammal detections should be plotted on this diagram for a reasonableness check on the expected received levels.

Overall, the validation document should reiterate all the goals and parameters stated in the planning document and verify that goals were/were not met, why, changes, etc. Also, the validation document should state whether the planning was suited to the needs of the survey and met the required mitigation standards.

B. MARINE DEBRIS PROJECT CRITERIA

Marine debris poses a threat to fish, marine mammals, sea turtles, and potentially other marine animals; causes costly delays and repairs for commercial and recreational boating interests; detracts from the aesthetic quality of recreational shore fronts; and increases the cost of beach and park maintenance. The discharge of garbage and debris has been the subject of strict laws, such as MARPOL-Annex V and the Marine Debris Act, 33 U.S.C. 1951 et seq., and regulations imposed by various agencies including the United States Coast Guard (USCG) and the U.S. Environmental Protection Agency (USEPA).

These protocols will be implemented by BOEM, BSEE, and lessees in complying with OCSLA (43 U.S.C. §§ 1331 et. seq), ESA (16 U.S.C. §§ 1531-1544) and/or MMPA (16 U.S.C. §§1361-1423h). The BOEM/BSEE proposed action under the 2025 NMFS BiOp includes robust avoidance or minimization measures (i.e., protocols), and those measures will continue to be implemented in the Gulf as project criteria under the 2026 Endangered Species Committee Order, as well as pursuant to the Bureaus' authority under OCSLA (43 U.S.C. §§ 1331 et seq.).

B.1. DEFINITIONS

Marine debris means as any object or fragment of wood, metal, glass, rubber, plastic, cloth, paper or any other solid, human-made item or material that is lost or discarded in the marine environment by the Lessee while conducting oil and gas activities on the OCS in connection with a lease, grant, or approval issued by BOEM and BSEE.

B.2. PROTOCOL

B.2.1 Marine Debris Placards

The permit holders must post placards that include each of the information text boxes in Attachment 1 of this Project Criteria in prominent places on all vessels, offshore training or orientation areas engaged in oil and gas operations in the Gulf OCS or where activity occurs. Each of the placards depicted, with the language specified, must be displayed on a 5x8 inch format or larger. One or more areas may be omitted if there is insufficient space. These notices must be referenced, and their contents explained, during any initial orientation given on the vessel. Placards must be sturdy enough to withstand the local environment and must be replaced when damage or wear compromises readability.

B.2.2. Marine Debris Training and Certification Process

All vessel operators, employees, and contractors performing OCS activities on behalf of the lessee must complete marine debris awareness training annually. The training consists of two parts:

1. viewing a marine debris training video or slide show (described below), and
2. receiving an explanation from management personnel that emphasizes their commitment to the requirements.

The marine debris training videos, training slide packs, and other marine debris related educational materials may be found at https://www.bsee.gov/debris and https://www.ooctraining.org/. The training videos, slides, and related material may be downloaded directly from the website.

Lessees engaged in oil and gas activities must continue to develop and use a marine debris awareness training and certification process that reasonably assures that they, and their respective employees, contractors, and subcontractors are, in fact, trained.

The training process must include the following elements:

1. A viewing of either the video or the slide show by the personnel specified above.

2. An explanation from the management that conveys the commitment of the company to achieve the objectives of the debris containment requirement.
3. Attendance measures (initial and annual).
4. Recordkeeping and availability of records for inspection by BSEE.

Training Report: By January 31st of each year, the lessee must provide BSEE with an annual report (1–2 pages) signed by a company official that describes your marine debris awareness training process, number of people trained, estimated related costs, and certifies that the training process has been followed for the previous calendar year. You should send the report and any questions concerning compliance by email to marinedebris@bsee.gov. In lieu of emailing the report, you may send a printed copy to:

Bureau of Safety and Environmental Enforcement
Environmental Compliance Division - Gulf of America Section
1201 Elmwood Park Blvd.
New Orleans, Louisiana 70123

B.3. Marine Debris Marking and Securing

Marking: Materials, equipment, tools, containers, and other items used in OCS activities which could be lost or discarded overboard must be clearly marked with the vessel or facility identification. All markings must clearly identify the owner and must be durable enough to resist the effects of the environmental conditions to which they may be exposed.

Securing: Materials, equipment, tools, containers, and other items used in OCS activities which could be lost or discarded overboard must be properly secured to prevent loss overboard.

Marine Debris Incidents

Recovery: Lessees must recover marine debris that is lost or discarded in the marine environment while performing OCS activities. If the marine debris is located within the boundaries of a potential archaeological resource and/or avoidance area, or a sensitive ecological and/or benthic resource area, the Lessee must contact BSEE for approval prior to conducting any recovery efforts that could impact the seafloor. The Lessee must enact steps throughout its OCS program to prevent similar incidents and must submit a description of these actions to BSEE in the Recovery Report below.

48-Hour Report: Lessees must submit a report to BSEE within 48 hours of a marine debris incident via marinedebris@bsee.gov. The “48-Hour Report” must describe recovery efforts or explain in detail if the Lessee determined that debris recovery is not warranted because (a) conditions are unsafe, (b) debris is insignificant and unrecoverable because it has floated away or sunk to the seafloor, or (c) debris is insignificant and immediate recovery is cost prohibitive. If conditions are unsafe, recovery must be attempted when conditions become safe. The Lessee must recover the marine debris lost or discarded if BSEE does not agree with the reasons provided by the Lessee to be relieved from the obligation to recover the marine debris. The 48- Hour Report must also include the following:

a) project identification and contact information for the lessee, operator, and/or contractor
b) the date and time of the incident
c) the lease number, OCS area and block, and coordinates of the object’s location (latitude and longitude in decimal degrees)
d) a detailed description of the dropped object to include dimensions (approximate length, width, height, and weight), composition (e.g., plastic, aluminum, steel, wood, paper, hazardous substances, or defined pollutants), and whether it floats or sinks in seawater
e) pictures, data imagery, data streams, and/or a schematic/illustration of the object, if available
f) indication of whether the lost or discarded item could be a magnetic anomaly of greater than 50 nanotesla (nT), a seafloor target of greater than 0.5 m, or a sub- bottom anomaly of greater than 0.5m when operating a magnetometer or gradiometer, side

scan sonar, or sub-bottom profiler in accordance with BOEM's and BSEE's applicable guidance

g) an explanation of how the object was lost; and a description of immediate recovery efforts and results, including photos.

Recovery Plan: The Lessee must submit a "Recovery Plan" to BSEE via marinedebris@bsee.gov if marine debris is not recovered in 48 hours and BSEE determines that recovery is warranted. If BSEE does not object to an assertion in the 48-Hour Report that recovery is not warranted, then a Recovery Plan is not needed. The Recovery Plan must be submitted no later than 10 calendar days from the date in which the incident occurred and must detail a plan to recover the debris within 30 days from the date in which the incident occurred. Unless otherwise objected to by BSEE within 48 hours of the filing of the Recovery Plan, the Lessee can proceed with the activities described in the Recovery Plan. The Lessee must request and obtain approval of a time extension if recovery activities cannot be completed within 30 days from the date in which the incident occurred.

Recovery Report: The Lessee must submit a "Recovery Report" to BSEE via marinedebris@bsee.gov within 10 calendar days from the date in which the recovery activities are completed. The Recovery Report must inform BSEE whether the debris has been recovered, a description of the recovery activities, and any substantial deviation from recovery activities as proposed in the Recovery Plan. The Lessee must describe steps enacted throughout all the Lessee's OCS leases to prevent similar incidents. If recovery was performed within 48 hours and described in the 48-Hour Report, or recovery is unwarranted, a Recovery Report is not required.

Decommissioning Application: Information on unrecovered marine debris must be included and addressed in the description of the site clearance activities provided in the decommissioning application required under 30 CFR § 285.906.

Attachment 1. Marine Debris Placards

WHAT IS MARINE DEBRIS?

Marine debris is any object or fragment of wood, metal, glass, rubber, plastic, cloth, paper or any other man-made item or material that is lost or discarded in the marine environment. Marine debris may be intentionally dumped, accidentally dropped, or indirectly deposited.

Whatever the source, marine debris is a direct result of human activities on land and at sea. Depending upon its composition, marine debris may sink to the seafloor, drift in the water column, or float on the surface of the sea.

Certain debris, such as plastics, can persist for hundreds of years in the marine environment without decomposing.

WARNING!

YOUR ACTIONS MAY SUBJECT YOU TO SEVERE LEGAL CONSEQUENCES!

The disposal and/or discharge of any solid waste anywhere in the marine environment (other than ground-up food particles) is strictly prohibited by U.S. Coast Guard and Environmental Protection Agency regulations. THIS INCLUDES MATERIALS OR DEBRIS ACCIDENTALLY LOST OVERBOARD.

The disposal of equipment, cables, chains, containers, or other materials into offshore waters is prohibited by the Bureau of Safety and Environmental Enforcement (30 CFR 250.300(b)(6)). THIS INCLUDES MATERIALS OR DEBRIS ACCIDENTALLY LOST OVERBOARD.

ATTENTION!

MARINE DEBRIS MAY CAUSE SEVERE ECOLOGICAL DAMAGE!

Marine debris discarded or lost from offshore and coastal sources may injure or kill fish, marine mammals, sea turtles, seabirds, and other wildlife.

Thousands of marine animals, including marine mammals, sea turtles and seabirds, die every year from being entangled in fishing line, strapping bands, discarded ropes and nets and plastic six-pack rings. Additionally, unknown numbers of marine animals die each year from internal injury, intestinal blockage, and starvation as a result of ingesting marine debris.

Marine debris fouls boat propellers and clogs water intake ports on engines thereby endangering the safety of fishermen and boaters and resulting in heavy loss of time and money.

Marine debris detracts from the aesthetic quality of recreational beaches and shorelines and increases the cost of park and beach maintenance.

ATTENTION!

SECURE ALL LOOSE ARTICLES!

NMFS now expects petroleum industry personnel to pick up and recover any articles lost overboard from boats and offshore structures as safety conditions permit. Additionally, 30 CFR 250.300(d) requires recording and reporting items lost overboard to the District Manager through facility daily operations reports.

Protect marine animals, as well as your valuable time and money, by doing the following to prevent accidental loss of these items:

Properly securing all materials, equipment, and personal belongings. Articles such as hardhats, life vests, sunglasses, cigarette lighters, parts bags, buckets, shrink wrap, strip lumber, and pipe thread protectors become marine debris when lost overboard.

Making sure that all trash receptacles have tight fitting lids and that the lids are used.

Providing and using secure cigarette butt containers. Cigarette butts are one of the most common forms of marine debris. Many cigarette butts contain some form of plastic and do not decompose in the ocean. Cigarette butts pose a major threat to marine wildlife as they resemble food and cause gut blockages and starvation when ingested.

Do our part to eliminate marine debris. Encourage others to be responsible about marine debris by making suggestions to secure potential marine debris on your boat or structure or by participating in a beach cleanup.

C. VESSEL STRIKE AVOIDANCE AND INJURED AND/OR DEAD AQUATIC PROTECTED SPECIES REPORTING PROJECT CRITERIA

These protocols (that are also considered project criteria because they were implemented as part of NMFS 2025 BiOp proposed action) will be required by BOEM, BSEE, and provide guidelines to operators in complying with OCSLA (43 U.S.C. §§ 1331 et seq.), ESA (16 U.S.C. §§ 1531-1544) and MMPA (16 U.S.C. §§1361- 1423h). The BOEM/BSEE proposed action under the 2025 NMFS BiOp includes robust avoidance or minimization measures (i.e., protocols), and those measures will continue to be implemented in the Gulf as project criteria under the 2026 Endangered Species Committee Order, as well as pursuant to the Bureaus' authority under OCSLA (43 U.S.C. §§ 1331 et seq.). The measures contained herein apply to all vessels associated with the federally regulated oil and gas program in the Gulf.

AQUATIC PROTECTED SPECIES IDENTIFICATION

Crew and supply vessel personnel should use a Gulf reference guide that includes identifying information on marine mammals, sea turtles, and other marine protected species (i.e., species that are not marine mammals and ESA- listed such as Gulf sturgeon, giant manta ray, or oceanic whitetip shark; hereafter collectively termed "other aquatic protected species") that may be encountered on the OCS or anywhere activity occurs. Vessel operators must comply with the below measures except under extraordinary circumstances when the safety of the vessel or crew is in doubt or the safety of life at sea is in question.

Vessel Strike Avoidance

1. Vessel operators and crews must maintain a vigilant watch for all aquatic protected species and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any protected species. A single aquatic protected species at the surface may indicate the presence of submerged animals in the vicinity of the vessel; therefore, precautionary measures should always be exercised. A visual observer aboard the vessel must monitor a vessel strike avoidance zone (species-specific distances detailed below) around the vessel according to the parameters stated below, to ensure the potential for strike is minimized. Visual observers monitoring the vessel strike avoidance zone can be either third-party observers or crew members (e.g., captain), but crew members responsible for these duties must be provided sufficient training to distinguish aquatic protected species to broad taxonomic groups, as well as those specific species detailed further below.
2. Vessel speeds must also be reduced to 10 knots or less when mother-calf pairs, pods, or large assemblages (greater than three) of any marine mammal are observed near a vessel.
3. All vessels must maintain a minimum separation distance of 100 m from sperm whales, and 500 m from any baleen whale to specifically protect the Rice's whale. If the species is indistinguishable, then operators should assume it is a Rice's whale and act accordingly.
4. All vessels must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 m from all "other aquatic protected species" including sea turtles and manatees, with an exception made for those animals that approach the vessel.
5. When aquatic protected species are sighted while a vessel is underway, the vessel should take action as necessary to avoid violating the relevant separation distance (e.g., attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area). If aquatic protected species are sighted within the relevant separation distance, the vessel should reduce speed and shift the engine to neutral, not engaging the engines until animals are clear of the area. This does not apply to any vessel towing gear (e.g., source towed array and site clearance trawling).
6. All vessels 20 m (65 ft) or greater in support of oil and gas activities must have a functioning AIS onboard and operating at all times as required by the USCG. Even if the USCG does not require AIS for the vessel, it is strongly encouraged. At minimum, the

reporting (as specified) must be followed and include trackline (e.g., time, location, and speed) data with Automatic Identification System (AIS) Maritime Mobile Service Identity (MMSI) numbers, if available.

The above requirements do not apply in any case where compliance would create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of that restriction, is unable to comply.

Injured and/or Dead Protected Species Reporting

At all times, vessel operators must report sightings of any injured or dead aquatic protected species as soon as possible but no greater than 24 hours, regardless of whether the injury or death was caused by the operator's vessel. If the injury or death was caused by a collision with the operator's vessel, the operator must immediately report the incident to the appropriate NMFS contact below for 24-hour response. The operator must further notify BOEM, BSEE, and NMFS immediately of the strike by email to protectedspecies@boem.gov, protectedspecies@bsee.gov and takereport.nmfsser@noaa.gov. The report must include the following information:

1. Name, telephone number, and email of company providing the report.
2. The vessel name at time of activity.
3. The lease number.
4. Time, date, and location (latitude and longitude [lat/long]) of the incident.
5. Species identification (if known) or description of the animal(s) involved.
6. Vessel's speed during and leading up to the incident.
7. Vessel's course/heading and what operations were being conducted (if applicable).
8. Status of all sound sources in use.
9. Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike.
10. Environmental conditions (e.g., wind speed and direction, Beaufort Sea State, cloud cover, visibility) immediately preceding the strike.
11. Estimated size and length of animal that was struck.
12. Description of the behavior of the marine mammal immediately preceding and following the strike.
13. If available, description of the presence and behavior of any other marine mammals immediately preceding the strike.
14. Estimated fate of the animal (e.g., dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared).
15. To the extent practicable, photographs or video footage of the animal(s).

Incidents Requiring Immediate Reporting

Review of your proposed activities identified use of equipment that has the potential for entanglement and/or entrapment of protected species (i.e., species protected under the ESA and/or MMPA) that could be present during operations. In case of entrapment, procedures and measures for reporting are dependent upon the situation at hand.

Certain scenarios or incidents require immediate reporting to Federal agencies; these are described below. Should any of the following occur at any time, immediate reporting of the incident is required after personnel and/or diver safety is ensured:

- Entanglement or entrapment of a protected species (i.e., an animal is entangled in a line or cannot or does not leave a moon pool of its own volition).
- Injury of a protected species (e.g., the animal appears injured or lethargic).
- Interaction or contact with equipment by a protected species.
- Any observation of a leatherback sea turtle within a moon pool (regardless of whether it appears injured, or an interaction with equipment or entanglement and/or entrapment is observed).

As soon as personnel and/or diver safety is ensured, any of the incidents listed above must be reported to NMFS by contacting the appropriate expert for 24-hour response. If an immediate response is not received, the operator must keep trying until contact is made. Any failed attempts should be documented. Contact information for reporting is as follows:

- Marine mammals: contact WHALE HELPLINE at 877-942-5343.
- Sea turtles: contact NMFS Veterinary Medical Officer at 352-283-3370. If no answer, contact 301-310-3061. This includes the immediate reporting of any observation of a leatherback sea turtle within a moon pool.
- Other protected species (e.g., giant manta ray, oceanic whitetip shark, or Gulf sturgeon): contact the ESA Section 7 biologist at 301-427-8413 (nmfs.psoreview@noaa.gov) and report all incidents to takereport.nmfs@noaa.gov.

The report must include the following information:

1. Time, date, water depth and location (latitude/longitude) of the first discovery (and updated location information if known and applicable).
2. Name, type, and call sign of the vessel in which the event occurred.
3. Equipment being used at time of observation.
4. Species identification (if known) or description of the animal(s) involved.
5. Approximate size of animal.
6. Condition of the animal(s) during the event and any observed injury and/or behavior.
7. Photographs or video footage of the animal(s), if able.
8. General narrative and timeline describing events that took place.

After the appropriate contact(s) have been made for guidance and/or assistance as described above, the operator may call BSEE at 985-722-7902 (24 hours/day) for questions or additional guidance on recovery assistance needs (if still required) and continued monitoring requirements. The operator may also contact this number if a timely response from the appropriate contact(s) listed above were not received. Minimum post-incident reporting includes all information described above in addition to the following:

1. NMFS liaison or stranding hotline that was contacted for assistance.
2. For moon pool observations or interactions:
   a) Size and location of moon pool within vessel (e.g., hull door or no hull door).
   b) Whether activities in the moon pool were halted or changed upon observation of the animal.
   c) Whether the animal remains in the pool at the time of the report, or if not, the time and date the animal was last observed.

Post-incident reporting should be made to BOEM/BSEE and NMFS at protectedspecies@boem.gov, protectedspecies@bsee.gov and takereport.nmfsser@noaa.gov.

D. VESSEL TRANSIT WITHIN THE RICE'S WHALE AREA

AS IDENTIFIED IN THE 2020 BIOLOGICAL OPINION'S REASONABLE AND PRUDENT ALTERNATIVE

Operators or their recognized representative must follow requirements below as appropriate when transiting through the Rice's Whale Area as identified in the 2020 Biological Opinion's Reasonable and Prudent Alternative (2020 RWA) when this transit is associated with either an initial plan/application or as part of a change to an existing plan/application when either vessel route and/or support base changes. The BOEM/BSEE proposed action under the 2025 NMFS BiOp includes robust avoidance or minimization measures (i.e., protocols), and those measures will continue to be implemented in the Gulf as project criteria under the 2026 Endangered Species Committee Order, as well as pursuant to the Bureaus' authority under OCSLA (43 U.S.C. §§ 1331 et seq.).

If transiting through any portion of the 2020 RWA, the BOEM Permit/Plan holder must submit a Post Transit Report upon completion to fulfil the reporting requirements as stated below to BOEM and BSEE (protectedspecies@boem.gov and protectedspecies@bsee.gov). Please be advised that changes to the use of a support base may trigger a revised plan (e.g., 30 CFR § 550.283), revised application, or modified permit (for geological and geophysical [G&G] activities). In the revised plan, application or permit, operators are required to follow the requirements defined in the NMFS 2025 BiOp proposed action, as required by the 2026 ESA Committee Order and the Bureaus' authority under OCSLA.

1. In the 2020 RWA, vessel operators and crews must maintain a vigilant watch for Rice's whales at all times and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any Rice's whale. Visual observers monitoring the 500 m vessel strike avoidance zone for Rice's whales can be either third- party observers or crew members (e.g., captain), but crew members responsible for these duties must be provided sufficient training to distinguish aquatic protected species to broad taxonomic groups, as well as those specific species detailed further below. If the species is indistinguishable, then operators should assume it is a Rice's whale and act accordingly (see below).

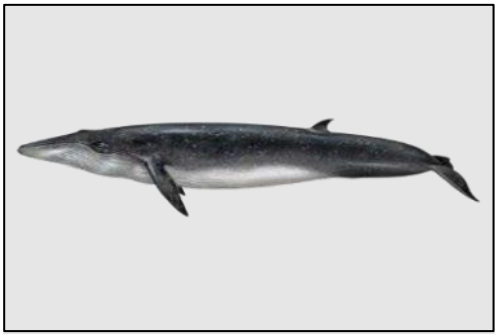

Figure depicting a Rice's whale

2. After completing transit through the 2020 RWA, you must prepare within seven (7) days a Post Transit Report describing the time the vessel entered and departed the 2020 RWA, any Rice's whale sightings or interactions (e.g., vessel avoidance) that occurred during transit, and any other marine mammal sightings or interactions. Post Transit Reports must be submitted to protectedspecies@boem.gov and protectedspecies@bsee.gov. The subject line of the email should include "Post Transit Report through 2020 RWA". Minimum reporting information is described below:
   a) The plan, permit or other BOEM or BSEE number used to identify the activity.
   b) Port used for mobilization and demobilization.
   c) Automatic Identification System (AIS) including Maritime Mobile Service Identity (MMSI) numbers, if available.
   d) Time and date vessel entered and exited the 2020 RWA.

e) Time, date, water depth, and location (latitude/longitude) of the first sighting of the animal.
f) Name, type, and call sign of the vessel in which the sighting occurred.
g) Species identification (if known) or description of the animal involved.
h) Approximate size of animal (if known).
i) Condition of the animal during the event and any observed injury / behavior (if known).
j) Photographs or video footage of the animal, if available.
k) General narrative and timeline describing the events that took place.
l) Time and date vessel departed 2020 RWA.
m) Trackline (e.g., time, location, and speed) of vessel while within 2020 RWA.
n) Environmental conditions, including Beaufort Sea State (BSS) and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon.

3. All vessels, regardless of size, must observe a 10-knot, year-round speed restriction in the 2020 RWA. The only exception to the 10-knot vessel speed restriction would be when observing the speed restriction would cause the safety of the vessel or crew to be in doubt or the safety of life at sea to be in question.
4. No transit is permissible through the 2020 RWA at nighttime or during low visibility conditions (e.g., BSS 4 or greater) except for emergencies (i.e., when the safety of the vessel or crew would otherwise be in doubt or the safety of life at sea is in question).
5. All vessels must maintain a minimum separation distance of 500 m from Rice's whales. If a whale is observed but cannot be confirmed as a species other than a Rice's whale, the vessel operator must assume that it is a Rice's whale and take appropriate action.
6. All vessels 65 feet (ft) or greater associated with oil and gas activity (e.g., source vessels, chase vessels, supply vessels) must have a functioning Automatic Identification System (AIS) onboard and operating at all times as required by the USCG. If the USCG does not require AIS for the vessel, it is strongly encouraged. At minimum, the reporting (as specified herein) must be followed and include trackline (e.g., time, location, and speed) data, with Automatic Identification System (AIS) Maritime Mobile Service Identity (MMSI) numbers, if available.
7. If an operator, while operating within the 2020 RWA
   a) exceeds the 10-knot vessel speed,
   b) does not maintain a 500 m minimum separation distance from a Rice's whale, and/or
   c) conducts transit in the 2020 RWA during nighttime or during low visibility conditions (e.g., BSS 4 or greater),

   the operator must notify BSEE and BOEM by emailing protectedspecies@bsee.gov and protectedspecies@boem.gov within 24 hours. The notification must be reported as a separate and distinct notification to the Post Transit Report with the title "Transit Deviation through 2020 RWA" in the subject line. The notification must provide a detailed explanation as to why the transit deviation occurred.
8. This Protocol does not remove or alter the need to comply with any other applicable regulatory or legal requirements with respect to vessel operations, including as outlined in the *Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Project Criteria*.

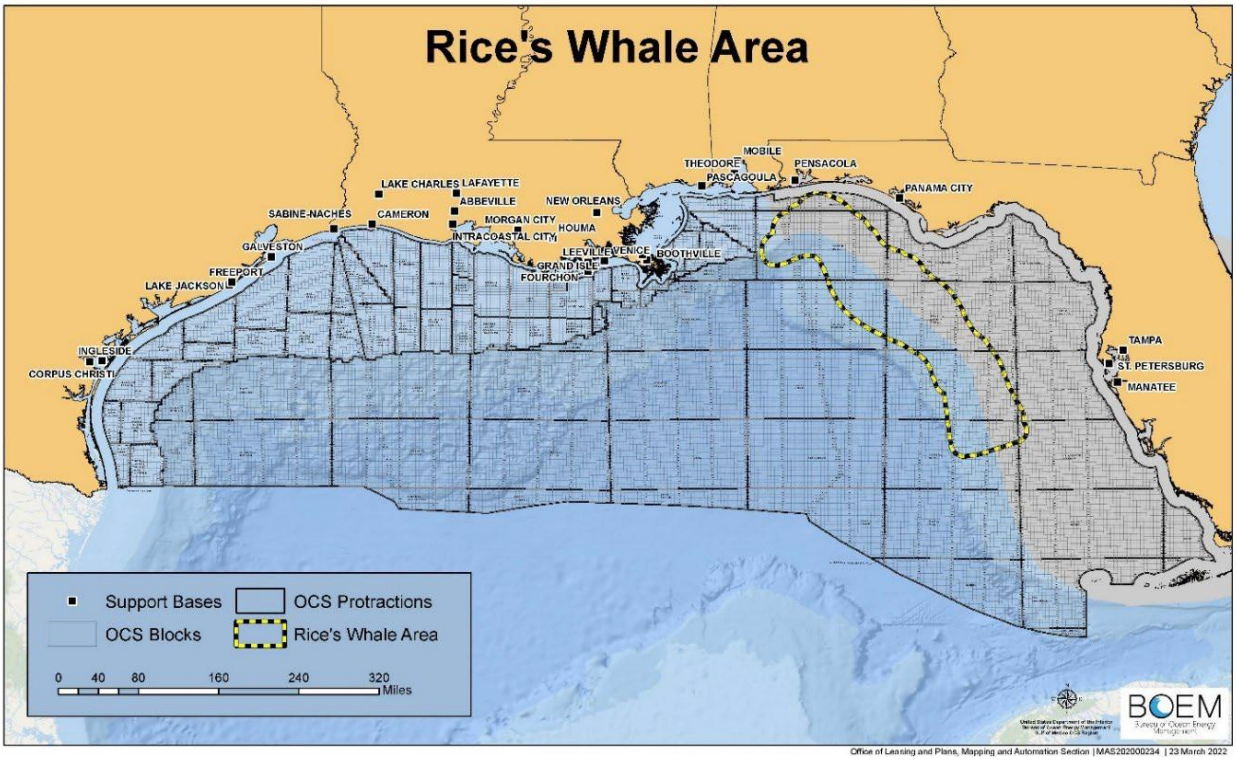

Figure depicting the 2020 RWA.

E. IN-WATER LINE PRECAUTION PROJECT CRITERIA

The BOEM/BSEE proposed action under the 2025 NMFS BiOp includes robust avoidance or minimization measures (i.e., protocols), and those measures will continue to be implemented in the Gulf as project criteria under the 2026 Endangered Species Committee Order, as well as pursuant to the Bureaus' authority under OCSLA (43 U.S.C. §§ 1331 et seq.). If operations require the use of flexible, small diameter lines to support operations (with or without divers), operators and/or contractors must reduce the slack in the lines, except for human safety considerations, to prevent accidental entanglement of protected species (i.e., species protected under the ESA and/or MMPA). This requirement includes tether lines attached to remotely operated equipment. The requirements below must be followed for any activities entailing use of flexible, small diameter lines that will not remain continuously taut, except when complying with these requirements would put the safety of divers, crew, or the vessel at risk:

- Operators must use tensioning tools and/or other appropriate procedures to reduce unnecessary looseness in the lines and/or potential looping.
- The lines must remain taut, as long as additional safety risks are not created by this action.
- A line tender must be present at all times during dive operations and must monitor the line(s) the entire time a diver is in the water.
- Should the line tender and/or diver become aware of an entanglement of an individual protected species, the reporting requirements described above must be followed as soon as safety permits.

F. MOON POOL MONITORING PROJECT CRITERIA

The following protocol (which is known as Project Criteria based on its inclusion in the NMFS 2025 BiOp proposed action) would apply to all activities entailing use of the moon pool, except under circumstances when complying with these requirements would put the safety of the vessel or crew at risk. The BOEM/BSEE proposed action under the 2025 NMFS BiOp includes robust avoidance or minimization measures (i.e., protocols), and those measures will continue to be implemented as project criteria under the 2026 Endangered Species Committee Order, as well as pursuant to the Bureaus' authority under OCSLA (43 U.S.C. §§ 1331 et seq.). If any protected species (i.e., species protected under the ESA and/or the MMPA) is detected in the moon pool, you are required to follow the appropriate procedures described in *Reporting Requirements* below.

Application of these measures includes, but is not limited to, dive support vessels, service vessels, pipelaying vessels, drillships, floating platforms (e.g., SPAR), mobile offshore drilling units, and other facilities with enclosed moon pools (e.g., well in the hull of a vessel, with or without a door).

GENERAL REQUIREMENTS

- Where the moon pools have hull doors, the operator(s) should keep the doors closed as much as reasonably practicable when no activity is occurring within the moon pool, unless the safety of crew or vessel require otherwise. This will prevent protected species from entering the confined area during periods of non-activity.
- Use of a moon pool requires regular monitoring while open to the water column and if a vessel is not underway. Regular monitoring means 24-hour video monitoring with hourly recurring checks for at least five minutes of the video feed, or hourly recurring visual checks of the moon pool for at least five minutes by a dedicated crew observer with no other tasks during that short visual check.
- If water conditions are such that observers are unable to see within a meter of the surface, operations requiring the lowering or retrieval of equipment through the moon pool must be conducted at a rate that will minimize potential harm to protected species.

CLOSURE OF THE HULL DOOR

- Should the moon pool have a hull door that can be closed, then before and after closure, the moon pool must be motored continuously by a dedicated crew observer with no other tasks to ensure that no individual protected species is present in the moon pool area. If visibility is not clear to the hull door from above (e.g., turbidity or low light), 30 minutes of monitoring is required before hull door closure.
- If a protected species is observed in the moon pool before the closure of the hull door, the hull door must not be closed, except for human safety considerations. Once the observed animal leaves the moon pool, the operator may commence closure. If the observed animal remains in the moon pool, contact NMFS or BSEE before the closure of the hull doors according to reporting requirements (see Reporting Requirements under Reporting of Observations of Protected Species within an Enclosed Moon Pool).

MOVEMENT OF THE VESSEL (NO HULL DOOR) AND EQUIPMENT DEPLOYMENT AND/OR RETRIEVAL

- Before movement of the vessel and/or the deployment and/or retrieval of equipment, the moon pool must be monitored continuously for a minimum of 30 minutes, by a dedicated crew observer with no other tasks, to ensure no individual protected species is present in the moon pool area.
- If a protected species is observed in the moon pool before movement of the vessel, the vessel must not be moved and equipment must not be deployed or retrieved, except for human safety considerations. If the observed animal leaves

the moon pool, the operator may commence activities. If the observed animal remains in the moon pool, contact BSEE before planned movement of the vessel according to reporting requirements (see Reporting Requirements under Reporting of Observations of Protected Species within an Enclosed Moon Pool).

- Should a protected species be observed in a moon pool before activity commences (including lowering or retrieval of equipment), recovery of the animal or other actions specific to the scenario may be required from NMFS to prevent interaction with the animal. If protected species are observed during activity, only reporting is required. Operators must not take such action except at the direction of, and after contact with, NMFS.

REPORTING REQUIREMENTS

Reporting of Observations of Protected Species within an Enclosed Moon Pool

If a protected species is observed within an enclosed moon pool and does not demonstrate any signs of distress or injury or an inability to leave the moon pool of its own volition, measures described in this section must be followed (only in cases where they do not jeopardize human safety). Although this particular situation may not require immediate assistance and reporting as described under *Incidents Requiring Immediate Reporting* (see Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Protocol), a protected species could potentially become disoriented with their surroundings and may not be able to leave the enclosed moon pool of their own volition. In order for operations requiring use of a moon pool to continue, the following reporting measures must be followed.

After 24 hours of any observation, and daily after that for as long as an individual protected species remains within a moon pool (i.e., in cases where an ESA-listed species has entered a moon pool but entrapment or injury has not been observed), the following information must be reported to BOEM and BSEE at protectedspecies@boem.gov, and protectedspecies@bsee.gov:

1. For an initial report, the information should include:
   a) Time, date, water depth and location (latitude/longitude) of the first discovery (and updated location information if known and applicable)
   b) Name, type, and call sign of the vessel in which the event occurred
   c) Equipment being utilized at time of observation
   d) Species identification (if known) or description of the animal(s) involved
   e) Approximate size of animal
   f) Condition of the animal(s) during the event and any observed injury / behavior
   g) photographs or video footage of the animal(s), if able
   h) General narrative and timeline describing events that took place.
2. For subsequent daily reports:
   a) Describe the animal's status to include external body condition (e.g., note any injuries or noticeable features), behaviors (e.g., floating at surface, chasing fish, diving, lethargic, etc.), and movement (e.g., has the animal left the moon pool and returned on multiple occasions?)
   b) Description of current moon pool activities, if the animal is in the moon pool
   c) Description of planned activities in the immediate future related to vessel movement or deployment of equipment
   d) Any additional photographs or video footage of the animal, if possible
   e) Guidance received and followed from NMFS liaison or stranding hotline that was contacted for assistance
   f) Whether activities in the moon pool were halted or changed upon observation of the animal
   g) Whether the animal remains in the pool at the time of the report, or if not, the time and date the animal was last observed.

G. SEA TURTLE RESUSCITATION GUIDELINES PROJECT CRITERIA

The BOEM/BSEE proposed action under the 2025 NMFS BiOp includes robust avoidance or minimization measures (i.e., protocols), and those measures will continue to be implemented in the Gulf as project criteria under the 2026 Endangered Species Committee Order, as well as pursuant to the Bureaus' authority under OCSLA (43 U.S.C. §§ 1331 et seq.). Any sea turtles taken incidentally during the course of oil and gas activities must be handled with due care to prevent injury to live specimens, observed for activity, and returned to the water according to the following procedures:

1. Sea turtles that are actively moving or determined to be dead (as described in paragraph (2)(iv) below) must be released over the stern of the boat. In addition, they must be released only when fishing or scientific collection gear is not in use, when the engine gears are in neutral position, and in areas where they are unlikely to be recaptured or injured by vessels.
2. Resuscitation must be attempted on sea turtles that are comatose or inactive by:
    a) Placing the turtle on its bottom shell (plastron) so that the turtle is right side up and elevating its hindquarters at least 6 inches (15.2 cm) for a period of 4 to 24 hours. The amount of elevation depends on the size of the turtle; greater elevations are needed for larger turtles. Periodically, rock the turtle gently left to right and right to left by holding the outer edge of the shell (carapace) and lifting one side about 3 inches (7.6 cm) then alternate to the other side. Gently touch the eye and pinch the tail (reflex test) periodically to see if there is a response.
    b) Sea turtles being resuscitated must be shaded and kept damp or moist but under no circumstance be placed into a container holding water. A water- soaked towel placed over the head, carapace, and flippers is the most effective method in keeping a turtle moist.
    c) Sea turtles that revive and become active must be released over the stern of the boat only when fishing or scientific collection gear is not in use, when the engine gears are in neutral position, and in areas where they are unlikely to be recaptured or injured by vessels. Sea turtles that fail to respond to the reflex test or fail to move within 4 hours (up to 24, if possible) must be returned to the water in the same manner as that for actively moving turtles.
    d) A turtle is determined to be dead if the muscles are stiff (rigor mortis) and/or the flesh has begun to rot; otherwise, the turtle is determined to be comatose or inactive and resuscitation attempts are necessary.

Any sea turtle so taken must not be consumed, sold, landed, offloaded, transshipped, or kept below deck.

Reporting requirements

Incident reporting should be made to BOEM/BSEE and NMFS at protectedspecies@boem.gov, protectedspecies@bsee.gov and takereport.nmfsser@noaa.gov.